NOZHA
LANGUAGE SCHOOLS

Ismailia Branch

Science

Second Prep.







Unit one

Lesson (1)

Oscillatory motion

Types of motion



Transition motion:

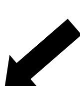
It is the motion which has starting and ending point.

Periodic motion:

It is the motion that repeated regularly in equal periods of time.

As: rotary bee







1- Oscillatory motion

It is the motion of oscillating body **around its rest** position where motion is repeated through equal intervals of time.

Examples on oscillatory motion:

- Clock - Swing - Spring
- Tuning fork -Simple pendulum

2- Wave motion

-Will be discussed in the next lesson.

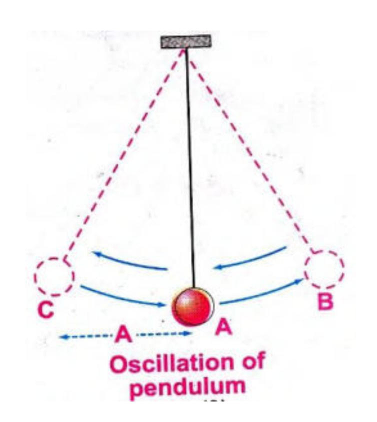




Simple pendulum

In the simple pendulum velocity is maximum at rest point(A), because the kinetic energy is max. $(K.E=1/2mv^2)$

Velocity is minimum at max points (B)&(C).



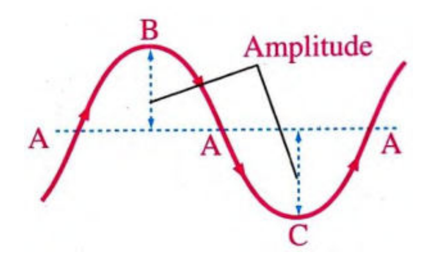
Concepts related to oscillatory motion

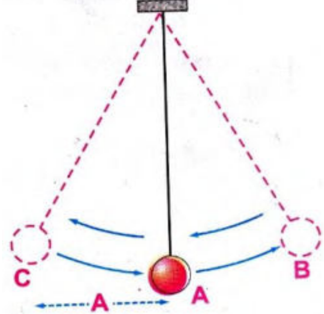
1) Amplitude:

It is the maximum displacement done by oscillating body away from its original position.

Units: meter – cm

Displacements AB=BA=AC=CA





2) Complete oscillation:

It is the movement made by the oscillating body when it passes a single point in its path two successive times in the same direction.

From A → B → A → C → A







1 Complete oscillation = 4 amplitude

1 Amplitude = ¼ complete oscillation

3) Periodic time: (T)

It is the time needed by an oscillating body to make a complete oscillation.

Unit : second

Rule:

$$T = \frac{total\ time}{no.of\ complete\ cycle}$$

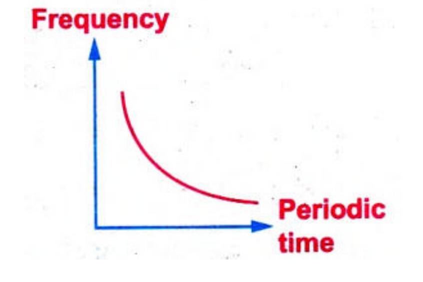
4) Frequency: (F)

It is number of complete oscillations made by an oscillating body in one seconds.

Unit: Hz

Rule:

$$F = \frac{no.of\ complete\ cycle}{total\ time}$$



F=(1/T) & T=(1/F)

SO F x T=1

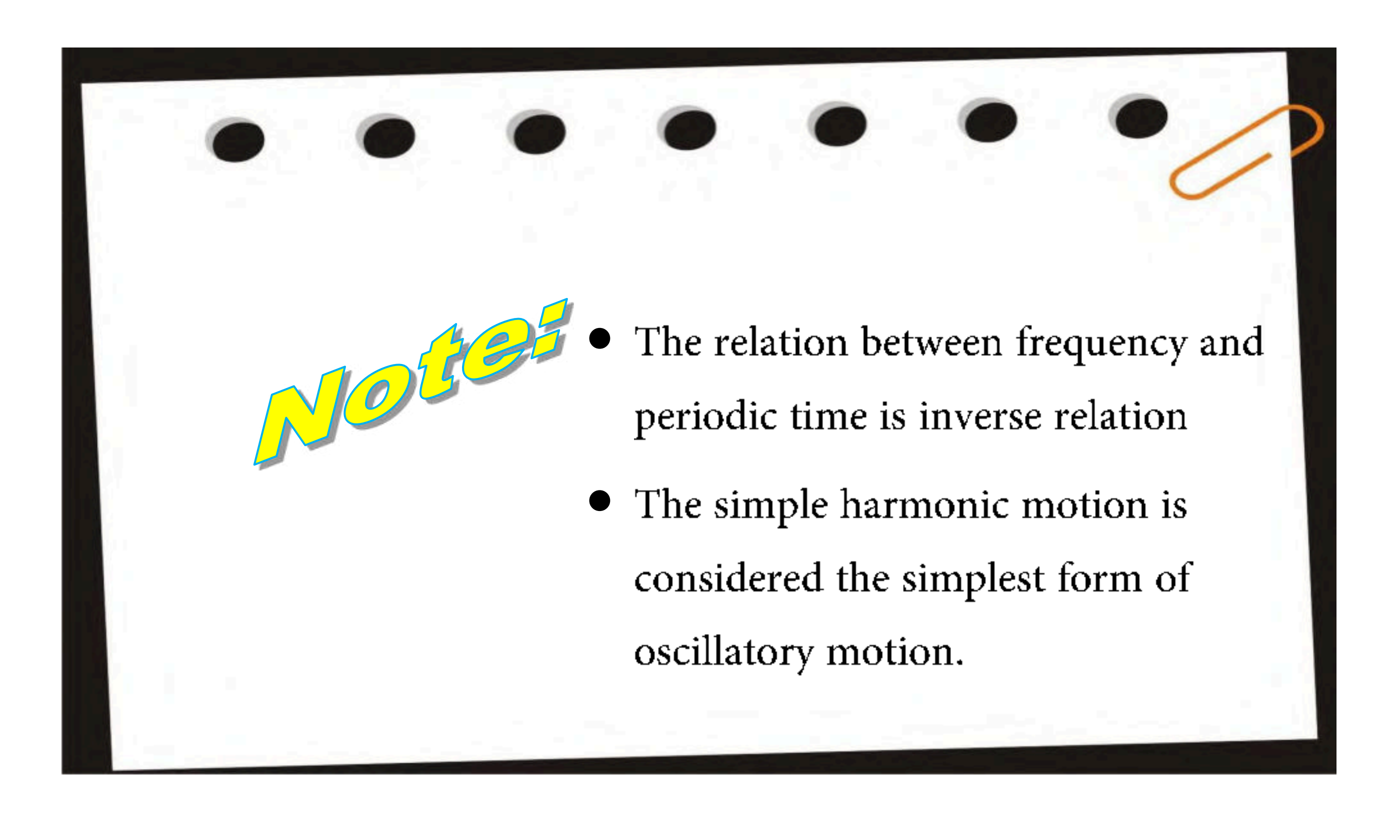
Units of frequency **hertz(Hz)**

Kilohertz=$1x10^3$Hz

Megahertz=$1x10^6$Hz

Gigahertz=$1x10^9$Hz





- The relation between frequency and periodic time is inverse relation
- The simple harmonic motion is considered the simplest form of oscillatory motion.







Homework

1) Complete:-

1- Oscillatory motion is

……………………..…………………………………………..……

2- The velocity of the oscillating body ………..… as the kinetic energy increases.

3- …………… , …………..……… , ……………… are examples of oscillatory motion.

4- If the maximum displacement done by the oscillating body away from its original position is 0.2 cm which is made in 0.5 seconds, so its amplitude is………………and the periodic time is ……………………..

5- Megahertz equals…………………..Hz and gigahertz equals………………Hz

6- Periodic time (T) = $\frac{\dots\dots\dots\dots}{\dots\dots\dots\dots} = \frac{\dots\dots\dots\dots}{\dots\dots\dots\dots}$

7- As the periodic time increases, the frequency ….....................….

2) Write the scientific term:-

1- It's the maximum displacement done by an oscillating body away from its point of rest. (………………)

2- The no. of complete oscillations done by the oscillating body in one second. (………………)

3- The motion done by an oscillating body when it passes by its point of rest 2 consecutive times . (………………)

4- It's the reciprocal of the periodic time. (………………)

5- It comprises 4 amplitudes. (………………)





3) Give reasons for:-

1- The movement of the rotary bee is not considered as a periodic motion

....

2- As the periodic time increases the frequency decreases

....

3- The product of frequency and periodic time equals unity.

....

5- Put (√) or (x) :

1- The oscillating body which its frequency is 20 HZ takes 20 seconds to make one complete oscillation. (   )

2- The motion of stretched string is considered as a wave motion (   )

6- What is meant by :

1- The frequency of tuning fork is 400 HZ.

....

....

2- The amplitude of an oscillating body is 0.4 meter.

....

....

3- 1500 is the no of complete cycle in 3sec.

....

....

4- The distance between two points one of them the K.E is zero and the other is max.

....

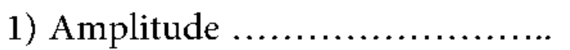
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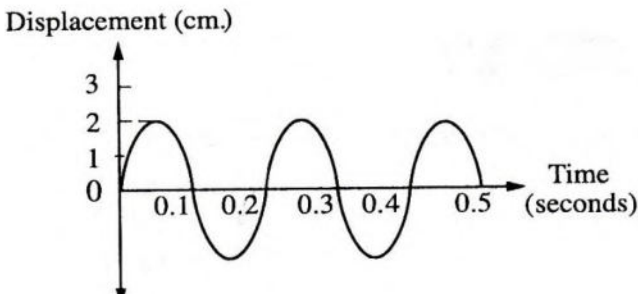
7- From the opposite figure of the oscillatory motion of a simple pendulum , calculate



1) Amplitude ……………………..

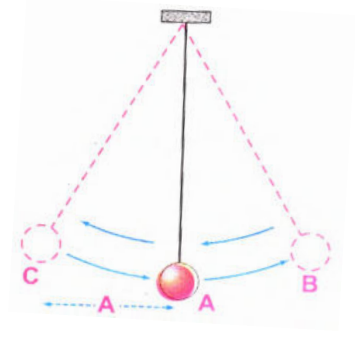
2) Periodic time ………………….

3) Frequency …………………….



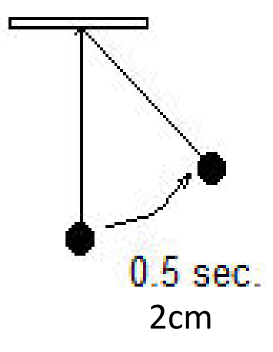
8- In the following figure, If the pendulum covers the distance AB in 0.01 sec. and the distance AB = 5 cm. find the following

1- The periodic time
2- The frequency
3- The length of the complete oscillation



9- In the following figure,. find the following

1- The periodic time
2- The frequency
3- The length of the complete oscillation
4- Amplitude.



10-Calculate the number of complete oscillation that are made by a body in 2 minutes if its frequency is 6 Hz.

……………………………………………………………………………………………
……………………………………………………………………………………………
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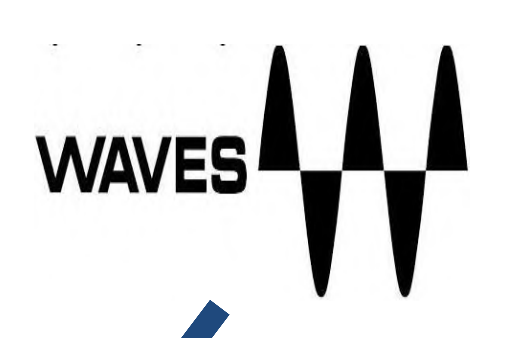


Unit one

Lesson (2)

Wave motion

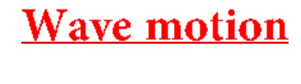
It is the second type of periodic motion.







It is the disturbance that propagates and transfer energy in the direction of propagation.

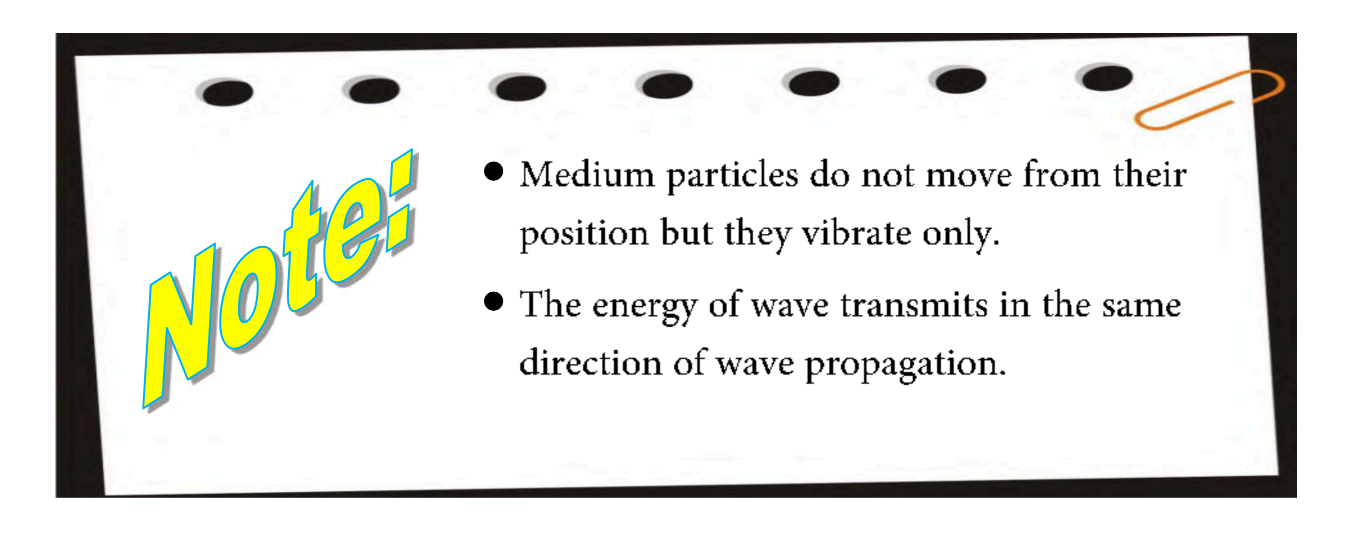


It is the motion that produced as a result of the vibration of the medium particles at a certain moment in a definite direction.

The line of wave propagation

It is the direction through which the wave propagates.





Note:

- Medium particles do not move from their position but they vibrate only.
- The energy of wave transmits in the same direction of wave propagation.

Types of waves

According to the direction of vibration of medium particles relative to the direction of propagation

Transverse waves	Longitudinal waves
It is the disturbance in which the medium particles vibrate perpendicular to the direction of wave propagation.	It is the disturbance in which the medium particles vibrate along the direction of wave propagation.
It consists of crests and troughs.	It consists of compressions and rarefactions.
As water waves	As sound waves
Crest, Trough, Transverse wave	Longitudinal wave, Compression, Rarefaction

Crest: It is the highest point of the particles of the medium in the transverse wave. **Trough:** It is the lowest point of the particles of the medium in the transverse wave.	**Compression:** It is the area at which the medium particles are of highest density and pressure. **Rarefaction:** It is the area at which the medium particles are of lowest density and pressure.

According to their ability to propagate and transfer energy

Mechanical waves		Electromagnetic waves
-They are waves that need a medium to propagate.		-They are waves that does not need a medium to propagate.
-Their speed is relatively low		-Their speed are very high (The speed of light=$3x10^8$)
They are Transverse waves As water waves	longitudinal waves As sound waves	They are all transverse waves. As light waves Radio waves (used in radars)











Life application:



Physiotherapy tubes (Jacuzzi)

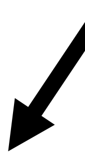
It is a tube where water moves in the form of circular waves.

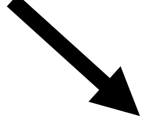
Uses of Jacuzzi: To treat

- Sprains and cramps: by using hot water.
- Nervous tension: by using cold water.

Concepts related to wave motion

1-Wave length:(λ)





Wave length of transverse wave

It is the distance between two crests or toughs.

Wave length of longitudinal wave

It is the distance between the centers of two successive compressions or rarefactions.

Unit: meter

Rule:

$$\lambda = \frac{total\ distance}{no.of\ cycles.}$$





2- Amplitude:

It is the maximum displacement done by the medium particles away from their rest position.

Unit: meter or centimeter

1 millimeter=$1x10^{-3}$metre

1 micrometer=$1x10^{-6}$

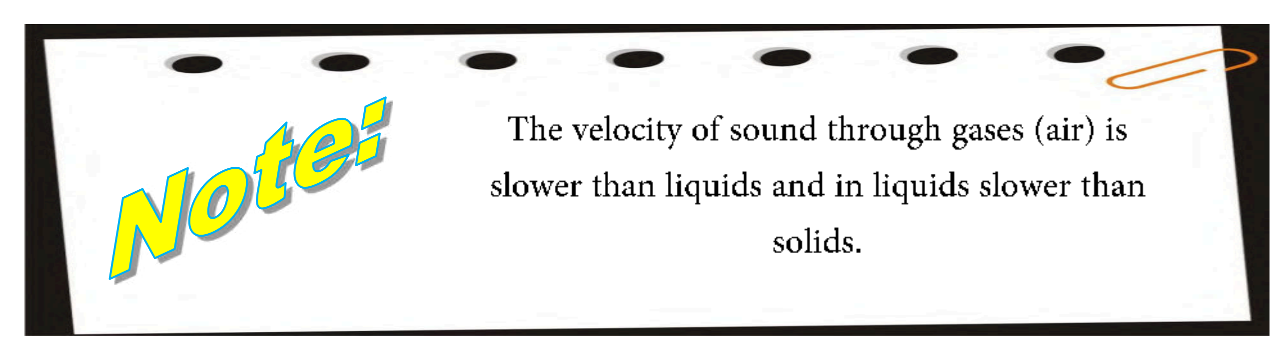
3- The wave velocity: (V)

It is the distance covered by the wave in one second.

Unit: (m/s)

Rule:

$$V = \frac{total\ distance}{total\ time}$$



4- Wave frequency: (F)

It is the number of waves produced from the source in one second.

Unit: (Hertz)

Rule:

$$F = \frac{no.of\ complete\ cycle}{total\ time} \quad \textbf{or} \quad F = \frac{1}{T}$$

Law of wave velocity:

It is the relation between wave velocity (V) ,frequency(F) and wavelength (λ)

Wave velocity (V) = Frequency (F) x wave length (λ)









1) Complete:-

1- The wave is ....

2- The wave transfers the energy to the particles of the medium without

....

3- Waves are classified into .... & .... according to the direction of medium particles vibration.

4- Waves are classified into .... & .... according to the types of energy which they carry

5- The transverse wave is composed of .... &.................

6- The longitudinal wave is composed of .... & ....

7- Transverse waves as .... while longitudinal waves as

....

8-If the distance between the centers of 2nd and 7th crests is 30 cm so the wave length is ....

2) Write the scientific term:-

1- It's the highest point in the transverse wave. (......................)

2- It's the highest density pressure in the longitudinal wave.

(......................)

3- It's the lowest point in the transverse wave. (......................)

4- It's the product of frequency & wave length. (......................)





5- It's the disturbance that occurred in a medium transferring energy in a certain direction at a certain time (......................)

3) What happens if:

1- Sound is produced under the water surface.

....

2- The distance between 2 consecutive crests increases.

....

4) G . R . F

1- We don't hear the sound of the sun explosions

....

2- Radio waves are considered as electromagnetic transverse waves.

....

3- The sound waves are mechanical longitudinal waves.

....

4- Sound waves aren't considered as oscillatory motion.

....

6) Compare between:

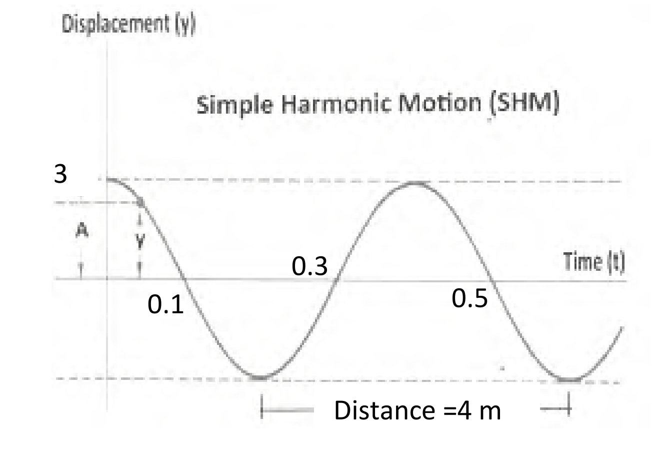
P.O.C	Transverse waves	longitudinal waves
Example		
Definition		





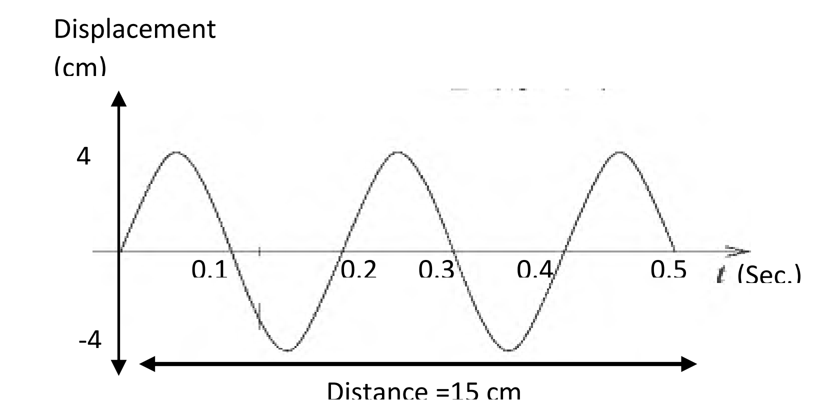
7- from the opposite figure Find:

1- Amplitude.
2- Wave length.
3- Periodic time.
4- Frequency.
5- Wave velocity.



8- from the opposite figure Find:

1- Amplitude.
2- Wave length.
3- Periodic time.
4- Frequency.
5- Wave velocity.



9-Answer the following problem:

The velocity of the propagation of a sound wave through wood is 1800 m/sec. Find the frequency of the sound source if the wave length of the produced wave is 6 meters

....

....

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Unit two

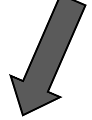
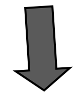
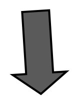
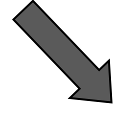
Lesson (1)

Properties of sound waves

Sound

It is an external stimulus that affects the ear causing the sense of hearing.

Nature of sound waves

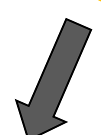
- Sound waves produced from vibration of bodies and it stops when the vibrating bodies stop their vibration.
- Sound is mechanical wave so it need a medium (as air) to propagate.
- Sound is longitudinal wave as it consists of compressions and rarefactions.
- Sound waves propagate through media as spheres whose centers are the source of sound.

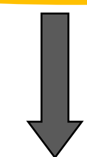


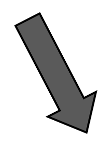





Types of sound waves







1- Pleasant to our ears:
They are tones that have uniform frequency as (mechanical tones)

2- Source of disturbance and noise: They are tones that have non uniform frequency as (Drills – Loud speakers – Horns of cars).

3- Source of fear:
As (Sound of strong wind and thunder)

Sound velocity

It is the distance which covered by the sound wave in one second

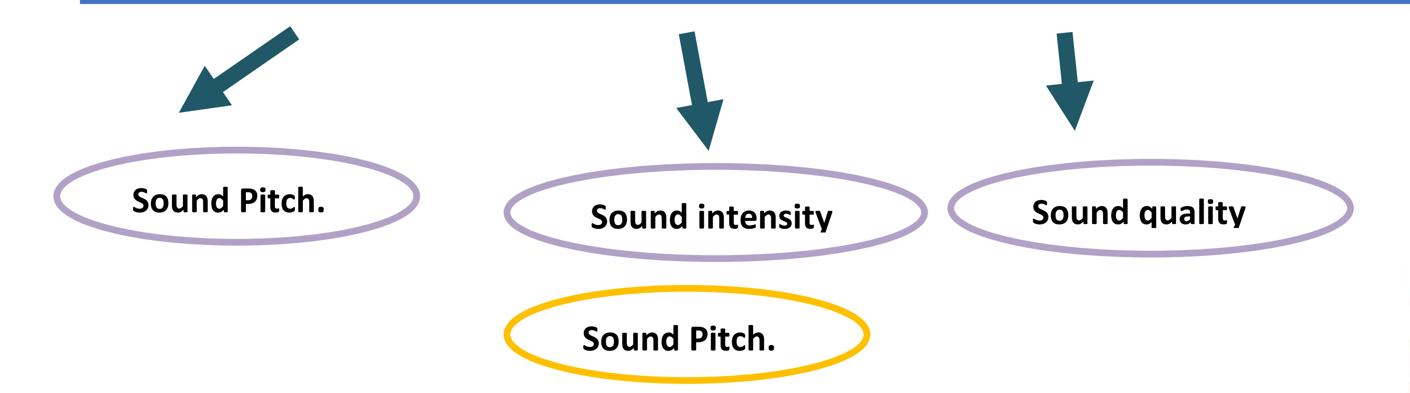
$$V = F \times \lambda$$



- Velocity of sound through solids is larger than liquids
- Sound velocity in liquids is higher than gases.
- Sound velocity through air is 340 m/sec



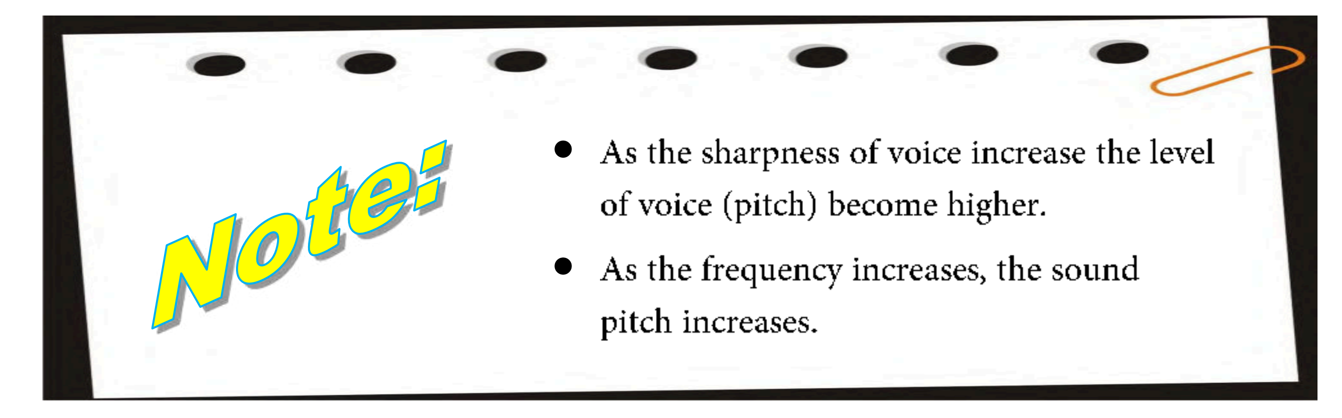
Properties of sound waves



Sound Pitch.

It is the property by which the ear can distinguish between rough and sharp voices.

High pitched	Low pitched
Sharp (soft) As voice of women, sparrows.	Rough (harsh) As voice of men, lion.



- As the sharpness of voice increase the level of voice (pitch) become higher.
- As the frequency increases, the sound pitch increases.







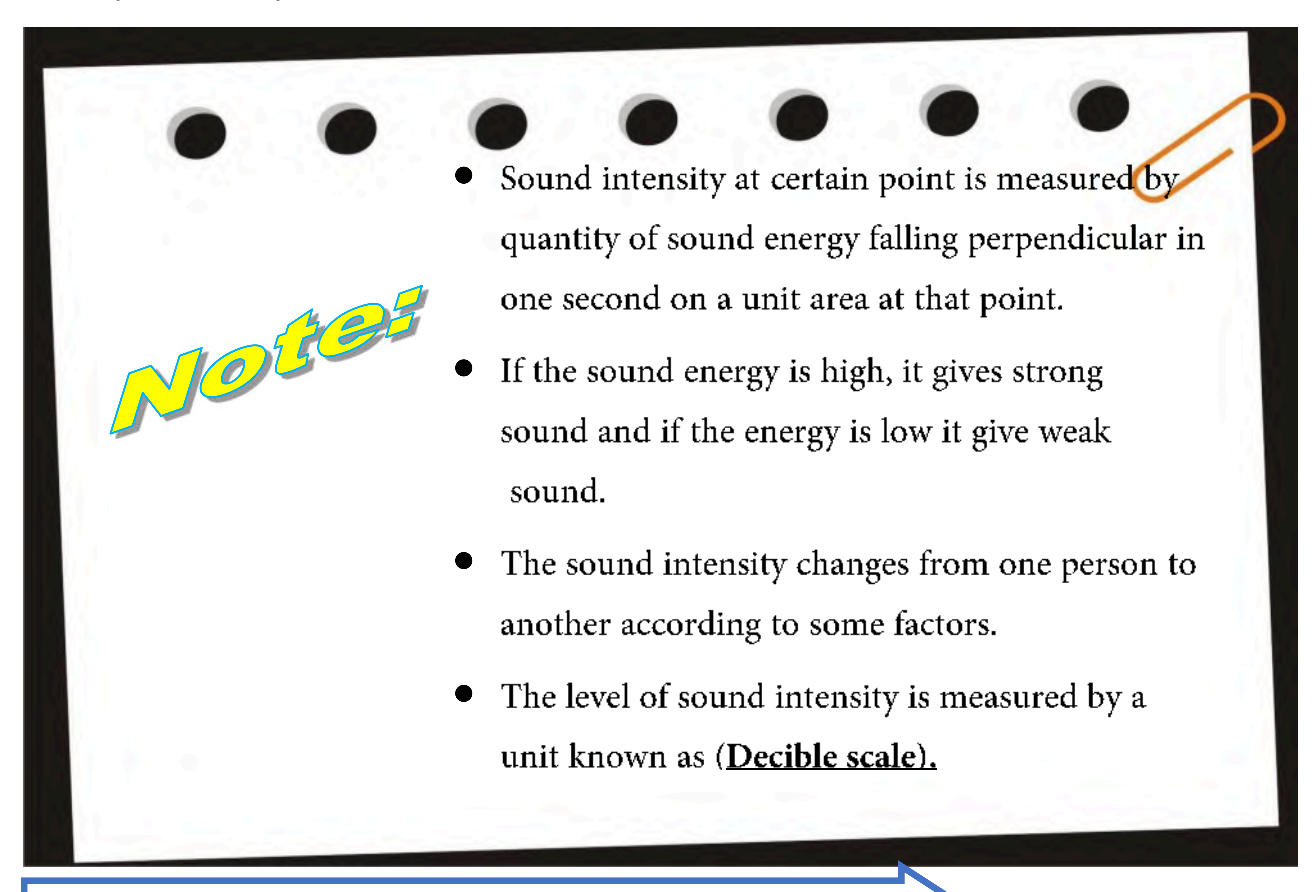
Determination the pitch of a tone by using Savart's wheel:

$$F = \frac{\text{Number of cycles (d) x number of gear's teeth (n)}}{\text{Time (seconds)}}$$

Sound intensity

It is the property by which the ear can distinguish between strong or weak sounds.

Unit: (watt/m^2)



- Sound intensity at certain point is measured by quantity of sound energy falling perpendicular in one second on a unit area at that point.
- If the sound energy is high, it gives strong sound and if the energy is low it give weak sound.
- The sound intensity changes from one person to another according to some factors.
- The level of sound intensity is measured by a unit known as (**Decible scale**).

Factors affecting the sound intensity:

1. **The distance between the ear and the sound source1.**
2. **The amplitude of vibration of sound source.**
3. **The area of the vibrating surface.**
4. **The density of the medium through which the sound wave propagates.**
5. **The direction of the wind.**





1- The distance between the ear and the sound source.

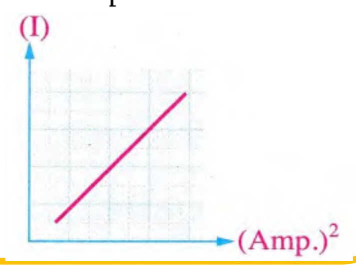
The intensity of the sound (I) at a point is inversely proportional to the square of the distance (d^2) between the point and the sound source.

-This is called "The inverse square law of sound. $I \propto \frac{1}{d^2}$

2- The amplitude of vibration of sound source:

Sound intensity is directly proportional to square of the amplitude.

$I \propto amp^2$



3- The area of vibrating surface:

- Sound intensity increase when the surface area of the vibrating body increases. $I \propto$ area
- So it is prefer to put a vibrating object touches a resonance box as the violin or guitar to increase the surface area and increase sound intensity.

4- Medium density:

Sound intensity is directly proportional to the density of the medium in which sound travels. $I \propto$ density of medium

- So sound intensity in CO_2 is higher than air

5- Wind direction:

The intensity of sound increases when the direction of wave propagation is in the same direction of wind and vice versa.





Real life application: **(Ear plugs)**

Ear plugs made of silicon, take the shape of the external ear canal sold in pharmacies to avoid the hazards of noise in loud places.

Sound type (quality)

It is the property by which the ear can distinguish between different sounds according to the nature of sound even if they are equal intensity and pitch.

Examples

1) **Tuning fork:** It produce pure and simple tone known as **Fundamental tone**
2) **Violin & piano:** They produce **complicated waves** although they are equal in pitch and intensity.

-The complicated tones composed of **fundamental tones** associated by **Harmonic tones** that are high in pitch and low in intensity.

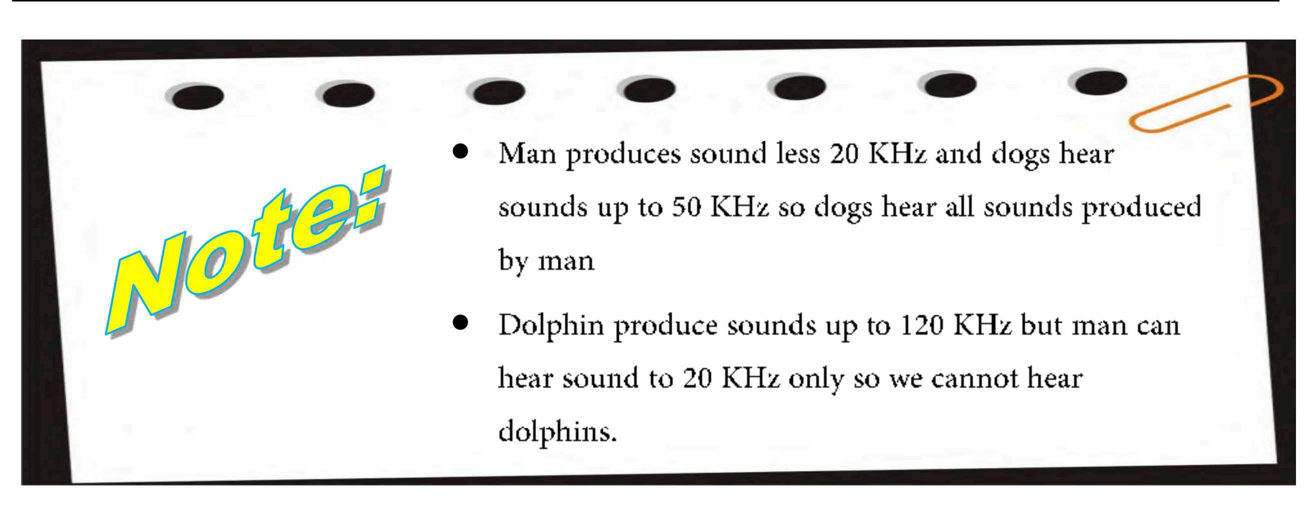
- The harmonic tones differ according to the nature of sound source.

Harmonic tones:

They are tones accompany the fundamental tones and they are low in intensity and high in pitch and they differ from one source to another .



Comparing sound waves according to frequency:		
Audible sounds	**Non-audible sounds**	
Sonic waves	**Ultrasonic waves**	**Infrasonic waves**
They are sound waves of frequency Range from (20 Hz) to (20 K Hz) The brain translate them into sound Produced by sonar	They are sound waves of frequencies higher than (20 K Hz) As the waves that preceding rain falls	They are sound waves of frequencies less than 20 Hz As the storms that devices or some animals As dolphin and bats



Real life applications of ultrasonic waves:

1- In medical field:

1-Breaking down kidney and ureter's stones without any surgical intervention (operations).

2-Diagnosis of male prostate gland tumors and its effect on bladder.

3-Discovering malignant tumors.

2- In industrial field:

Sterilization of food, water and milk as it is characterized by its high ability to kill some types of bacteria and stop the action of some viruses.

3- Military field: Discovering of landmines.








1) Complete the following statements:-

1- Sound waves propagate through the medium as spheres of ……… and ………
2- Sound waves velocity = ………… × …………
3- Sharp tones have ……… frequencies, while rough tones have ……….. frequencies.
4- The sound pitch depends on the ……………. of the ……………….
5- Savart's wheel is used to determine the ………… of unknown sound tone.
6- In Savart's wheel, frequency = $\frac{No.of.rotations \times \ldots\ldots\ldots\ldots}{\ldots\ldots\ldots\ldots\ldots\ldots}$
7- The measuring unit of the sound intensity is …………………., while that of noise intensity is ……………..…….
8- The intensity of sound at a certain point is measured by the quantity of sound energy falling …………….……. in one second on a ……………. at this point.
9- When the distance between the sound source and the ear ………… two times, the sound intensity decreases ………… times.
10- When the amplitude of sound wave vibration is doubled, the intensity of sound ………… four times.
11-The fundamental tone is less in …… and higher in …….. than the harmonic tones.
12-The human ear can realize the sonic waves which its frequency ranging from ………………………. to ………… Hz.
13-Some animals such as ………, ………… and ……… can hear ultrasonic waves.
14- The measuring unit of the wave length is ……………… or ………………

2) Choose the correct answer:-

1- Before using the modern technology in communication, people in desert were putting their ears on the ground to hear the sound of horses of their enemies from very far places because …………
   a- Sense of hearing is stronger than sense of vision.
   b- The velocity of sound through solids (ground) is greater than that through air.
   c- Sound travels faster than light.
   d- Sound of horses' feet is very loud.





2- All of these sounds are tones of uniform frequency except the sound of …………

a- Violin b- guitar c- loudspeakers d- piano

3- The sound pitch increases by …………

a- the decrease of frequency. b- the increase of frequency.

c- the increase of amplitude.

d- the increase of the distance between the ear and the sound source.

4- The sound becomes rough by decreasing …………………

a- frequency b- amplitude c- harmonic tones d- quality

5- The frequency of the sound produced from Savart's wheel depends on …………

a- the speed of rotation of the gear only.

b- the distance between the gear and you only.

c- the number of gear's teeth only.

d- (a) and (c) are correct.

6- The intensity of sound weakens as we go away from its source, because …………

a) $I \propto \frac{1}{d}$ b) $I \propto d$ c) $I \propto \frac{1}{d^2}$ d) $I \propto d^2$

7- All of the following are factors affecting sound intensity except the …………

a- amplitude of vibration. b- medium density.

c- frequency. d- wind direction.

3) Write down the scientific term:-

1- The distance which is covered by the sound waves in one second. [ ]

2- A tone of irregular frequency that is produced from loudspeakers. [ ]

3- The measuring unit of the sound intensity. [ ]

4- The characteristic by which the human ear can distinguish between sounds from different sources even if they are equal in intensity and pitch. [ ]

4) Give reasons for:-

1- The explosions occurred on the Sun surface cannot be heard on the Earth.

………………………………………………………………………………………

2- The difference in frequency between the note (tone) and noise.

………………………………………………………………………………………





3- The intensity of sound increases when the sound source touches a resonance box.

....

4- As the λ increases the frequency decreases.

....

5) Problems:-

1- A sound source produces 2400 cycles in 2 minutes. If its wavelength is 17 meters, find the velocity of the sound waves.

....
....
....

2- **Calculate** the number of the gear's teeth of Savart's wheel, given that the frequency of the sound produced is 100 Hz. and the wheel rotates 30 cycles /min

....
....
....

3- Savart's wheel produces a sound of frequency 300 Hz. when a metallic plate touches a gear having 75 teeth. Find the time in minutes taken by the wheel to make 360 rotations.

....
....
....

From the opposite figure find :

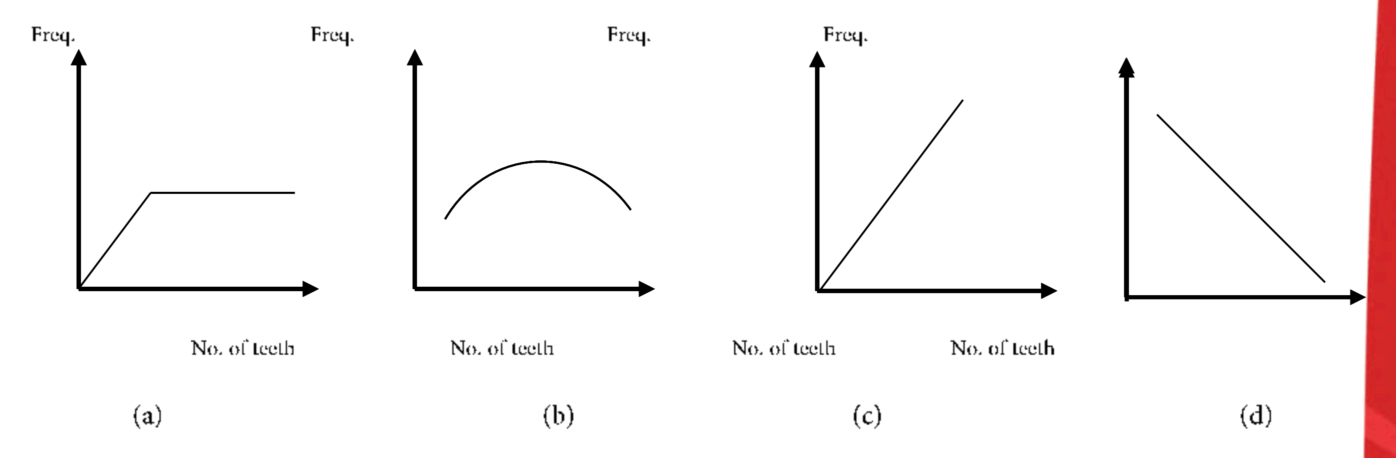
1. Wavelength.
2. Frequency.
3. Amplitude.
4. Wave velocity.

2 Seconds
1
0
-1
2 m.



6) Study the following figures, then answer the questions:-

1- In Savart's wheel, which of the following graphs represents the relation between the frequency and the number of gear's teeth at constant speed?



2) Which of the following figures represents the relation between the pitch of a sound and its frequency? Why?

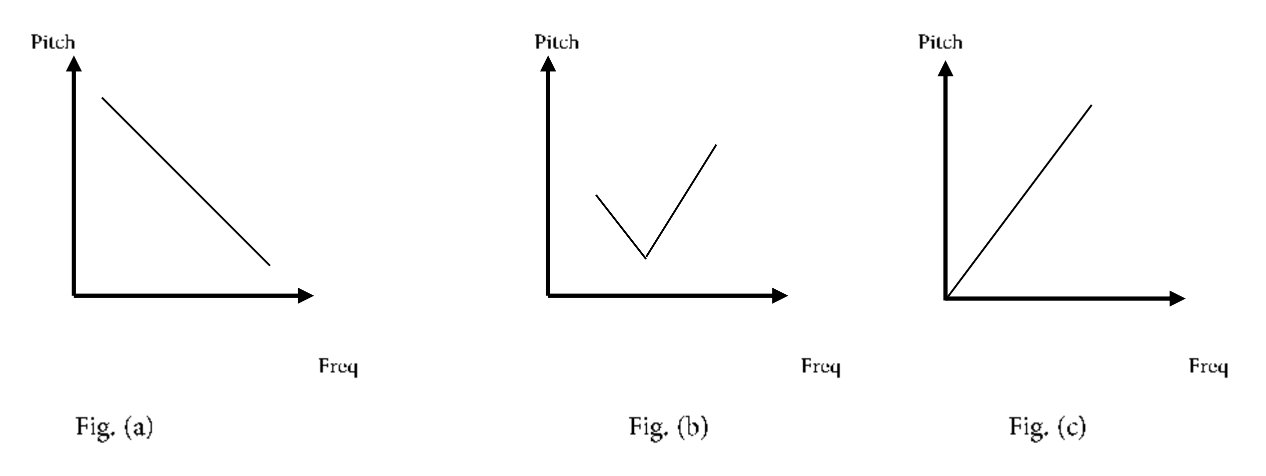
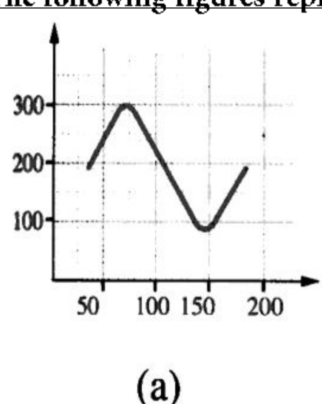


Fig. (a) Fig. (b) Fig. (c)

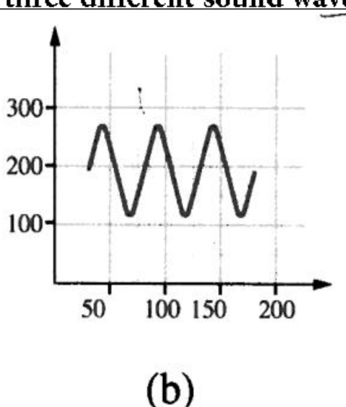




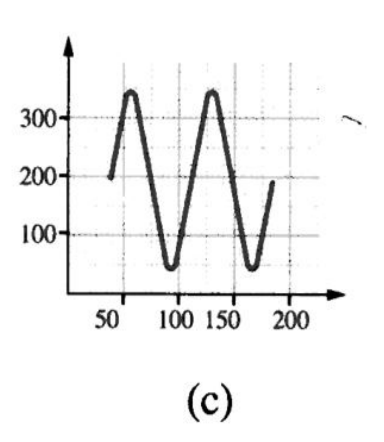
7) The following figures represent three different sound waves:-



(a)



(b)



(c)

1- Which figure has the largest amplitude?

2- Which figure represents a sharper tone? Why?

3- Which figure represents a rough tone? Why?

4- Which figure represents sound of higher intensity? Why?

5- Complete:

a- As the amplitude increases, the sound becomes ....

b- As the frequency of sound decreases, the sound becomes of ....

8- Sound waves of frequency 200 HZ and wave length 1.7 meter in air calculate:

1. Velocity of sound waves in air.

....

2. Wave length of these waves when they propagate in water with velocity 1500 m/s.

....

Unit two

Lesson (2)

Wave nature of light

Light

It is an external factor affect eye causing the sense of vision.

Nature of light:

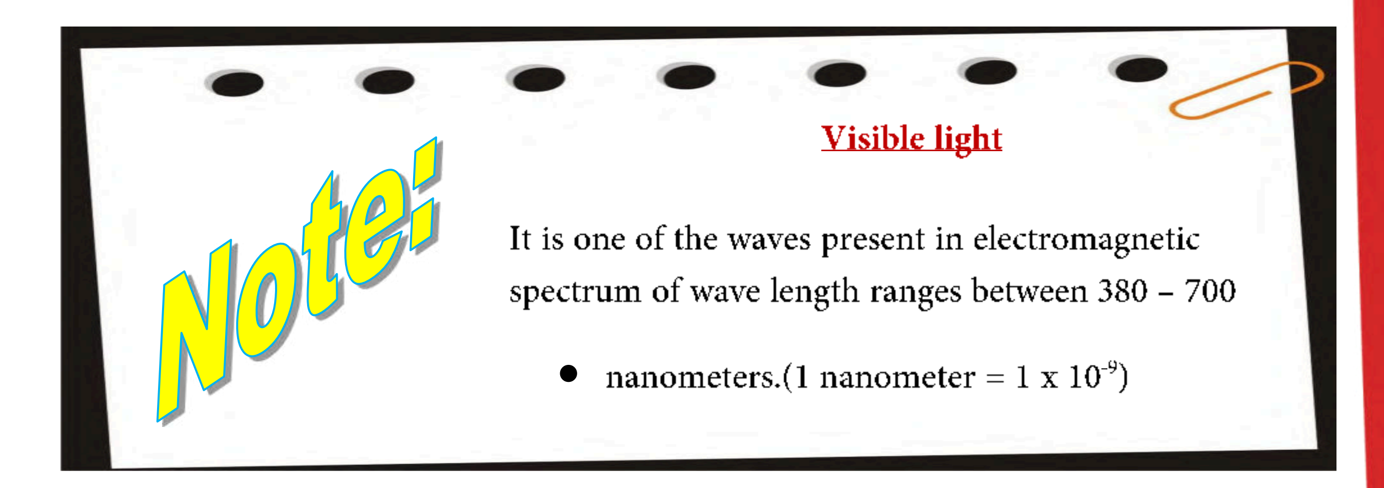
- Light waves are electromagnetic transverse waves.

-Speed of light through space is (3×10^8 m/s).

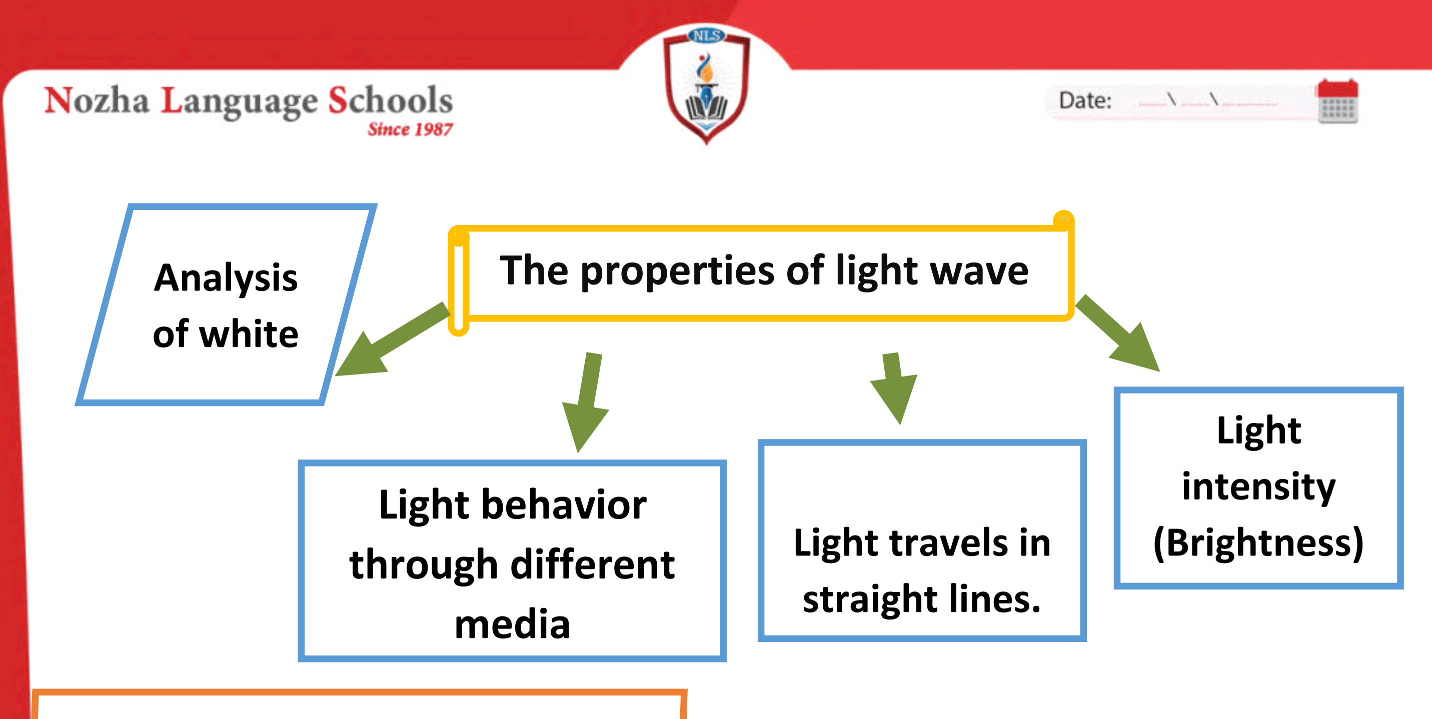
Speed of light

It is the distance covered by light in one second.

-Speed of light through space is (3×10^8 m/s).



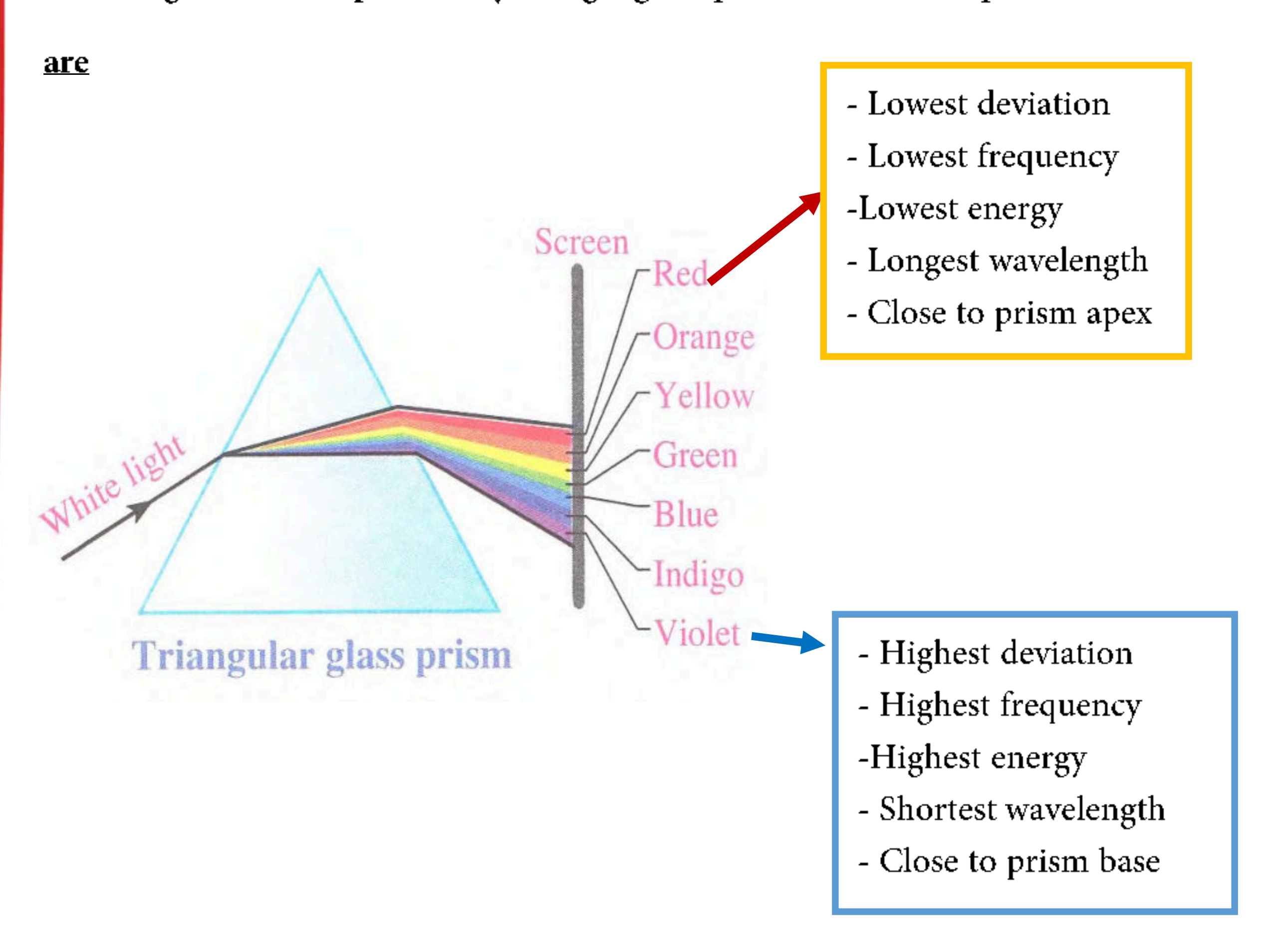




1- Analysis of white light

It is the splitting of white light into seven colors called spectrum colors.

White light can be separated by using a glass prism into seven spectrum colors which are







Note:

- The German scientist **Max Planck** proved that the energy of light waves is composed of packets of energy (Quanta) known as photons

-The energy of the photon is directly proportional to the frequency of light wave

Photon energy α Photon frequency
Photon energy = Const x photon frequency
This constant value is known as Planck's constant

E

F

Real life applications for uses of light (spot lights):

1-Light is used in home decorations like **spot light** to illuminate artifacts.

2- **Ornamented lamps** that bring happiness and joy to the place.

3- **Standing lamps** that concentrate light for reading.



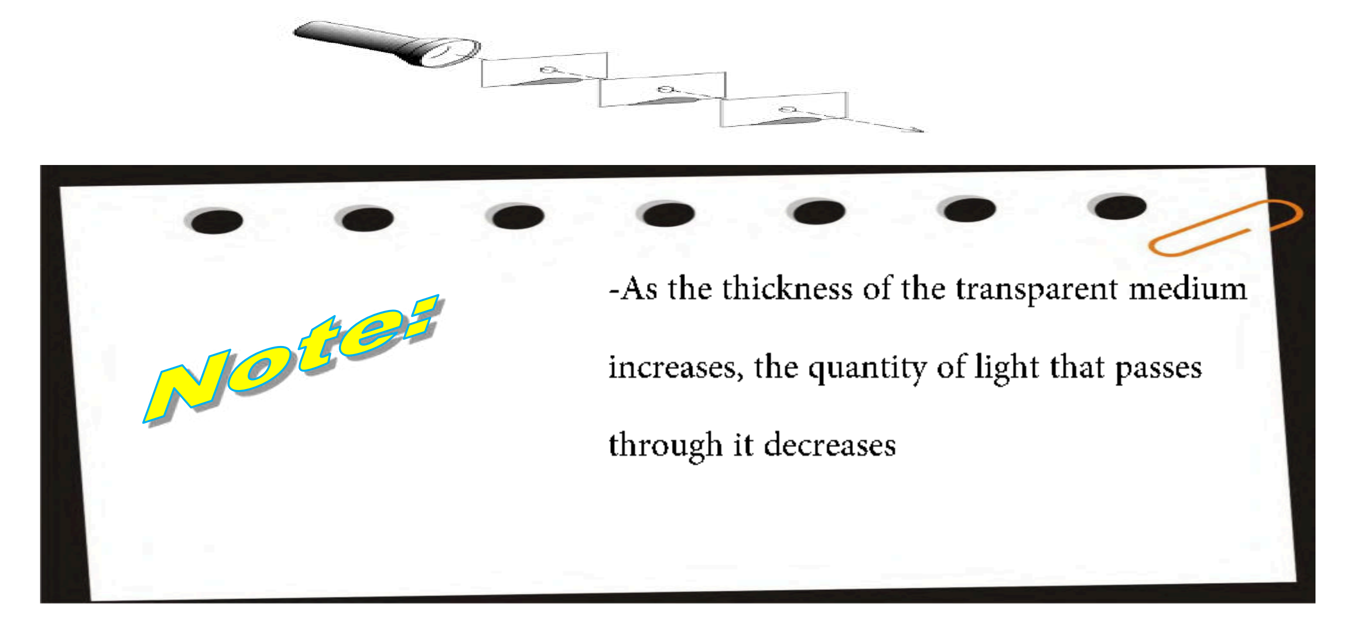
2- Light behavior through different media

Media can be classified according to their ability to allow light to pass into

Transparent materials	Translucent materials (Semi transparent)	Opaque materials
It is the medium which permits Most light to pass.	It is the medium that permits a part of light only to pass	It is the medium that does not permit light to pass
AS: air, clear glass, pure water	**As:** Flint glass, tissue paper	**AS:** milk, cartoon, black honey
Transparent — ALL light passes through	Translucent — SOME light passes through	Opaque — NO light passes through

3- Light travels in straight lines.

Light travels in straight lines with controlling its thickness.



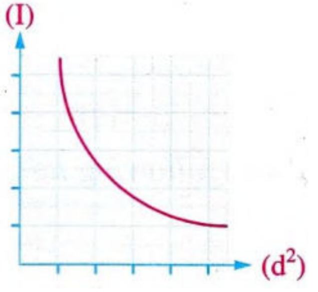
-As the thickness of the transparent medium increases, the quantity of light that passes through it decreases



4- Light intensity (Brightness)

It is the amount of light incident perpendicular to a unit area of a surface in one second.

- Light intensity of a source decrease as the distance between the surface and the light source increase.



- **The inverse square law of light:**

The light intensity of a surface is inversely proportional to the square of the distance between the surface and the light source.

$$I \propto \frac{1}{d^2}$$





Homework

1) Complete the following statements:-

1- Light is ……….. waves that travel though free space with velocity ………….. m/sec.

2- Visible light is one of the components of electromagnetic spectrum of wavelength ranges between …………… to …………… nanometers.

3- The distance covered by light in one second is called ……………

4- White light is a mixture of …………… colors known as ……………

5- The glass prism is used to analyze the …………… light into …………… colors.

6- …………… is the nearest color to the prism apex, while …………… is the nearest color to the prism base.

7- The …………… color has highest frequency and shortest wavelength, while the …………… color has the lowest frequency and longest wavelength.

8- The scientist …………… proved that the energy of light waves is composed of energy quanta known as ……………

9- The energy of the photon is ……….. proportional to the ……….. of light wave.

10- Energy of photon = constant × ……………

11- By increasing the ……….. of the transparent medium, the quantity of light that passes through it ……………

12- …………… is the quantity of light falling perpendicular to a ……………… of a surface in one second.



13- Light intensity of a surface …………… as the distance between the surface and the light source increases.

14-…………..and …………… are transparent media

2) Choose the correct answer:-

1- …………… color has the lowest deviation.

a- Violet b- Green c- Red d- Yellow

2- The photon energy equals ……………

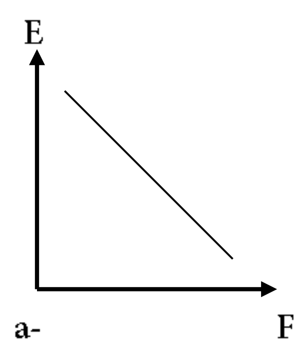
a- Planck's constant ÷ Frequency. b- Planck's constant + Frequency.

c- Planck's constant × Frequency. b- Planck's constant - Frequency.

3- The quanta of …………… color has the lowest energy.

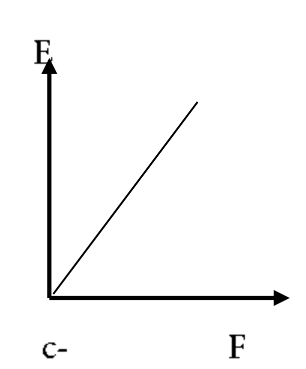
a- blue b- violet c- green d- red

4- Which of the following graphs represents the relation between the frequency of light (F) and its energy (E)?

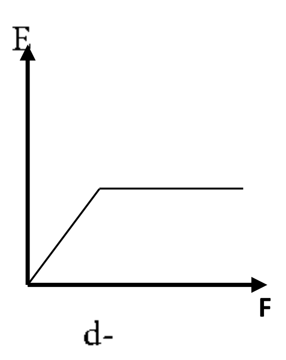


a-

E
F
b-



c-



d-

5- All of the following are examples of transparent media except ……………

a- air b- tissue paper c- glass d- clear water

6- By increasing the thickness of the transparent medium, the quantity of light that passes through it ……………

a- decreases b- increases

c- remains constant d- there is no correct answer





7- If the distance between a surface and light source decreases to its half, the light intensity of the surface ……………

a- decreases to its one fourth   b- decreases to its half

c- increases twice   d- increases four times

3) Write the scientific term for each of the following:-

1- One of the components of the electromagnetic spectrum of wavelength ranges between 380 : 700 nanometers. [ ]

2- The splitting of white light into seven spectrum colors. [ ]

3- A structure used to separate the white light into seven spectrum colors. [ ]

4- The color which has the lowest frequency, longest wavelength and lowest energy [ ]

5- The color which has the least deviation and it is the closest to the prism apex. [ ]

6- A medium doesn't allow light rays to penetrate through. [ ]

7- The light intensity of a surface is inversely proportional to the square of the distance between the surface and the source of light. [ ]

4) Give reason for:

1- Light can travel through space

……………………………………………………………………………………………

2-a clear glass is a transparent medium

……………………………………………………………………………………………
…

3-the intensity of light of a surface decreases to its quarter as the distance between the surface and light source is doubled





Unit two

Lesson (3)

Reflection and refraction of light

Light reflection

It is the returning back (rebounding) of light waves in the same medium on meeting a reflecting surface.

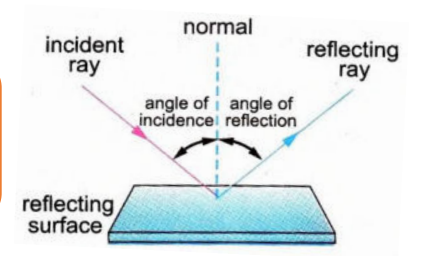
Types of light reflection

Regular reflection	Irregular (non uniform) reflection
It is the reflection of light rays in one direction when they meet a smooth (uniform) glistening reflecting surface.	It is the reflection of light rays in different directions when they when they meet a rough (non-uniform) reflecting surface.
Examples smooth surface: - plane mirror - stainless steel sheet - thin sheet of aluminum	**Examples on rough surface:** - leaf of tree - piece of leather - piece of paper - piece of wool





❖ Laws of light reflection



• First law

Angle of incidence = Angle of reflection.

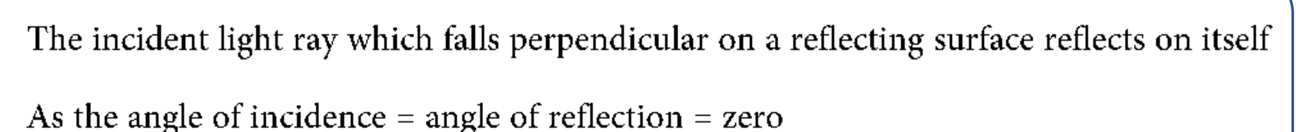
• Second law

The incident light rays, the reflected light ray and the normal to the surface of reflection at the point of incidence, all lie in one plane perpendicular to the reflecting surface.

Definitions

The incident light ray	It is a narrow light beam which is represented by a straight line; it intersects with the reflecting surface at the point of incidence.
The reflected light ray	It is a narrow light beam which is represented by a straight line that is reflected from the reflecting surface at the point of incidence.
Angle of incidence	It is the angle between the incident light ray and the line perpendicular to the reflecting surface at the point of incidence.
Angle of reflection	It is the angle between the reflected light ray and the line perpendicular to the reflecting surface at the point of incidence.





The incident light ray which falls perpendicular on a reflecting surface reflects on itself

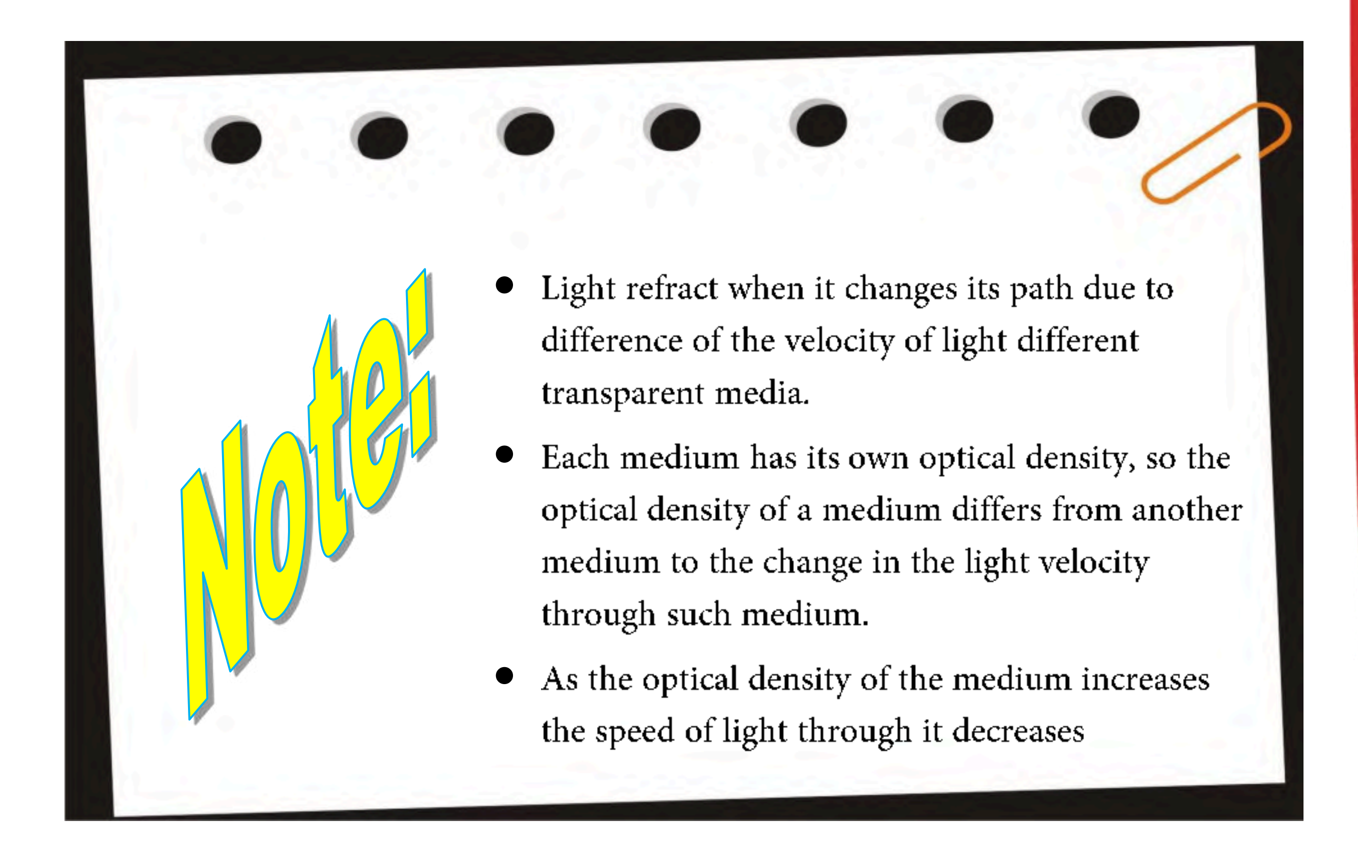
As the angle of incidence = angle of reflection = zero

Light refraction

It is the change of light path when it travels from a transparent medium to another transparent medium of different optical density.

Optical density of the medium

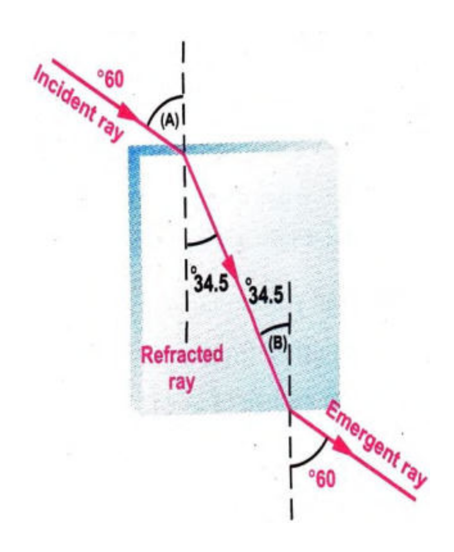
It is the ability of transparent medium to refract the light.



- Light refract when it changes its path due to difference of the velocity of light different transparent media.
- Each medium has its own optical density, so the optical density of a medium differs from another medium to the change in the light velocity through such medium.
- As the optical density of the medium increases the speed of light through it decreases



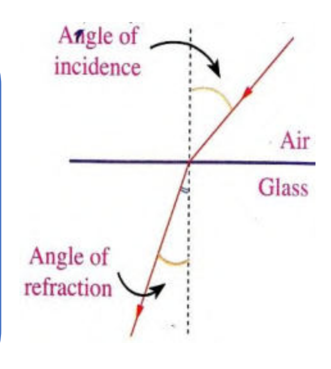
The angle of incidence	It is the angle between the incident light ray and the normal at the point of incidence on the interface.
The angle of refraction	It is the angle between the refracted light ray and the normal at the point of incidence on the on the interface
The angle of emergence	It is the angle between the emergent light ray and the normal at the point of emergence on the interface.



❖ Laws of light refraction

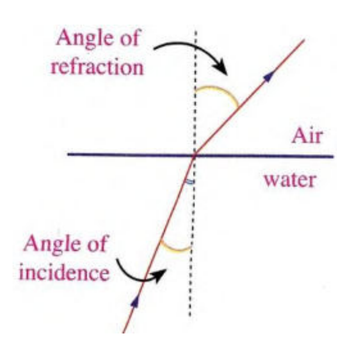
1- When a light ray travels from a transparent medium of lower optical density (like air or water) to another of higher optical density (like glass) it refracts near the normal.

→ **The angle of incidence is greater that the angle of refraction.**



2- When a light ray travels from a transparent medium of higher optical density (like glass) to another of lower from the normal.

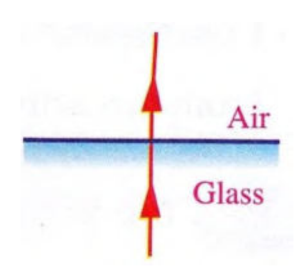
→ **The angle of incidence is less than the angle of incidence angle of refraction.**

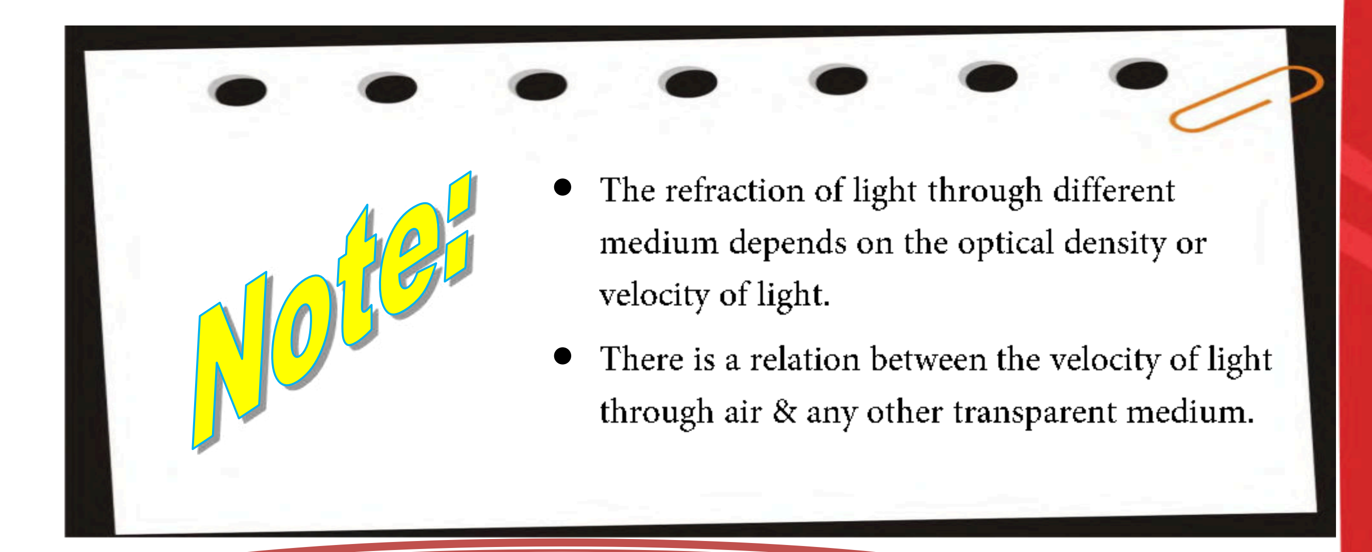




3- When a light ray falls perpendicular to the interface between two different transparent media it passes due to the other medium without refraction.

→ **The angle of incidence is less than the angle of incidence angle of refraction.**





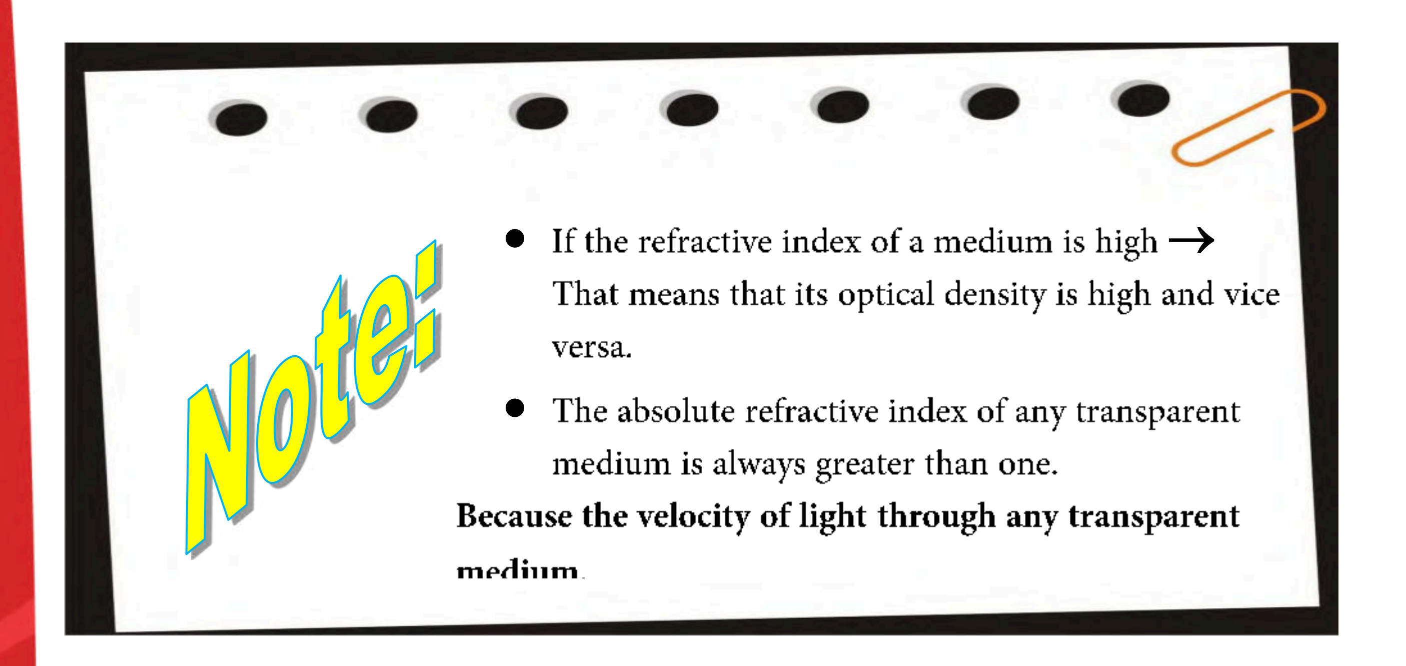
- The refraction of light through different medium depends on the optical density or velocity of light.
- There is a relation between the velocity of light through air & any other transparent medium.

Absolute refractive index of a medium

It is the ratio between the velocities of light through air to the velocity of light through another transparent medium.

$$\text{Absolute refractive index of a medium} = \frac{velocity\ of\ light\ through\ air}{velocity\ of\ light\ through\ medium}$$





❖ Natural phenomena related to reflection and refraction of light.

1) Apparent shapes of objects:-

Give reason:

A pencil which is partially immersed in water appears broken?

Due to the refraction of light rays coming from the immersed part of pen in water.

2) Apparent positions of object:-

Give reason:

The submerged object in water is seen in an apparent position slightly above its real position?

Due to the refraction of light rays coming from the object (away from the normal).

As the eyes sees the extensions of these refracted rays.

Give reason:

To pick up the object in water we must look at it vertical?

Because the light passes without any refraction.

Examples:-

→A fish in a basin seems at a position higher than its real position.





→ The bottom of the swimming pool filled with water seems higher than its true position.

3) Mirage

It is a natural phenomenon that takes place on the desert roads at noon especially in the summer times.

As objects on the road sides seem as if they have inverted images on a wet area.

Life applications:

Project of Soap bubbles Toy

The soap bubbles have spectrum color when light falls on it.

This happens by adding an amount of liquid soap to water and drops of glycerin to increase the duration of bubbles existence in air.





Homework

1- Write the scientific term:

1. Smooth or rough surface at which the reflection of light takes place. [...................................]
2. Angle between the incident light ray and the line perpendicular to the reflecting surface at the point of reflection. [...................................]
3. Ability of the transparent medium to refract the light. [...................................]
4. Angle between the reflected light ray and the line perpendicular to the reflecting surface at the point of reflection. [...................................]
5. Angle between the emergent light ray and the line perpendicular to the point of emergence. [...................................]
6. The ratio between the velocity of light through air to the velocity of light through another transparent medium. [...................................]
7. A narrow light beam represented beam represented by a straight line that is reflected from the reflecting surface. [...................................]

1- What is meant by?

1- The refractive index of water is 1.3

....

2- Angle of reflection = 30^0

....

3- Angle of incidence =60^0

....

4- Angle of emergence = 20^0

....

2- What happens when?

1. You look to a pencil partially immersed in a cup of water.

....

2. A light ray falls perpendicular on a reflecting surface.

....





3. Parallel light rays fall on a rough surface.

   ……………………………………………………………………………………..

4. A light ray falls on a reflecting surface by an angle 30^0.

   ……………………………………………………………………………………..

5. A light ray passes from air (have lower optical density) to glass (have higher optical density)

   ……………………………………………………………………………………..

6. A light ray passes from air (have higher optical density) to glass (have lower optical density)

   ……………………………………………………………………………………..

3-Problems:

1- Calculate the absolute refractive index of water, knowing that the velocity of light through air is 3×10^8 m/s and the speed of light in water is 2.25×10^8 m/s.

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

2-If the angle between the incident and reflected rays is 140^0. Find the angle of incidence and angle of reflection.

……………………………………………………………………………………………

……………………………………………………………………………………………

3-If the absolute refractive index of water is 4/3 and the velocity of light through water is 2.25×10^8 m/s calculate the velocity of light through air.

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

4-Give reason for

1- The pencil which is partially immersed in water appears as being broken

………………………………………………………………………………………………

………………………………………………………………………………………………







2- When a light ray passes through a glass prism it refracts

....

....

3- To see a coin which has fallen in a beaker filled with water in its real position , we must look at it vertically

....

....

5-Choose the correct answer:

1- The angle between the reflected light ray and the incident light ray = 90^0, so the angle of reflection = ………..

a-0 b-45 c-90 d-60

2- When the light ray falls perpendicular on the mirror so the angle of incidence =…

a-0 b-45 c-90 d-60

3- In ……….. reflection , the reflected light rays are reflected in different directions.

a-regular b-uniform c-total internal d-irregular

4-If the angle between the a reflected light ray and a reflecting surface is 30^0, so the angle of reflection will be equal to……………………..

a-15 b-30 c-90 d-60

5-The angle of incidence is greater than angle of refraction when a light travels from....

a-air to water b-air to glass c-water to air d- a&b

6-The angle between the emergent light ray and the normal at the point of emergence on the interface is called the angle of ……….

a-incidence b-reflection c-refraction d-emergence



Unit three

Lesson (1)

Reproduction in plants

The flower:

- It is a short stem whose leaves are modified to form different parts of the flower.

- It is the organ of sexual reproduction in flowering plants.

- It arises from a floral bud which emerges from the axle of a leaf called bract.

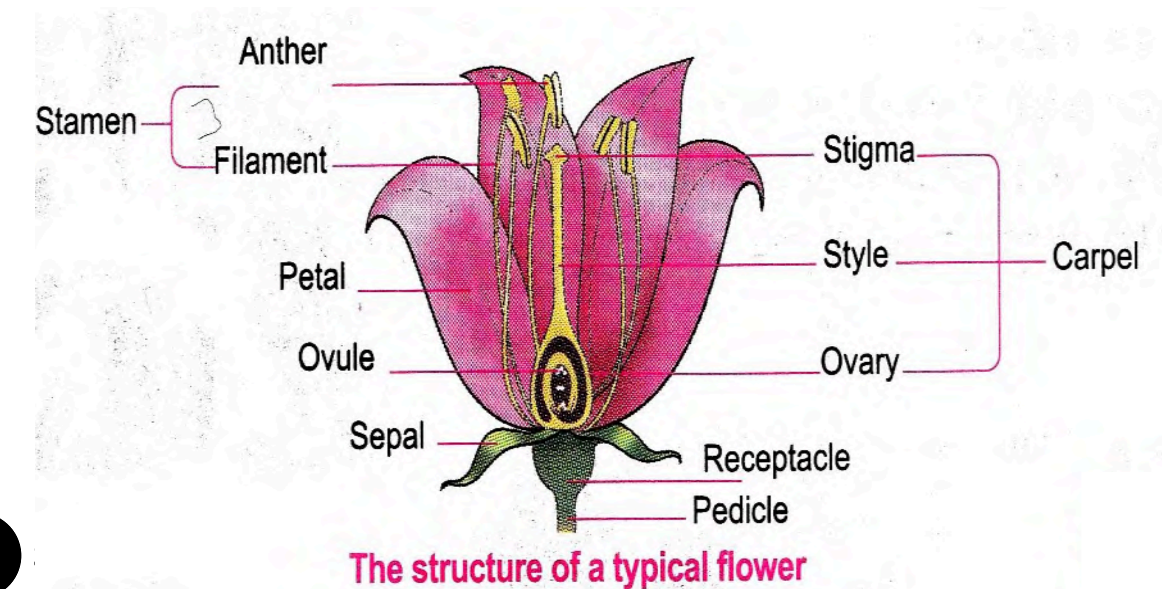
*The axle may carry a number of flowers and in this case it is known as inflorescence.

Inflorescence

It is a group of flowers arranged in the same axle

Bract:

It is the leaf from which the floral bud carrying the flower emerges.



The structure of a typical flower





* The structure of a typical flower:

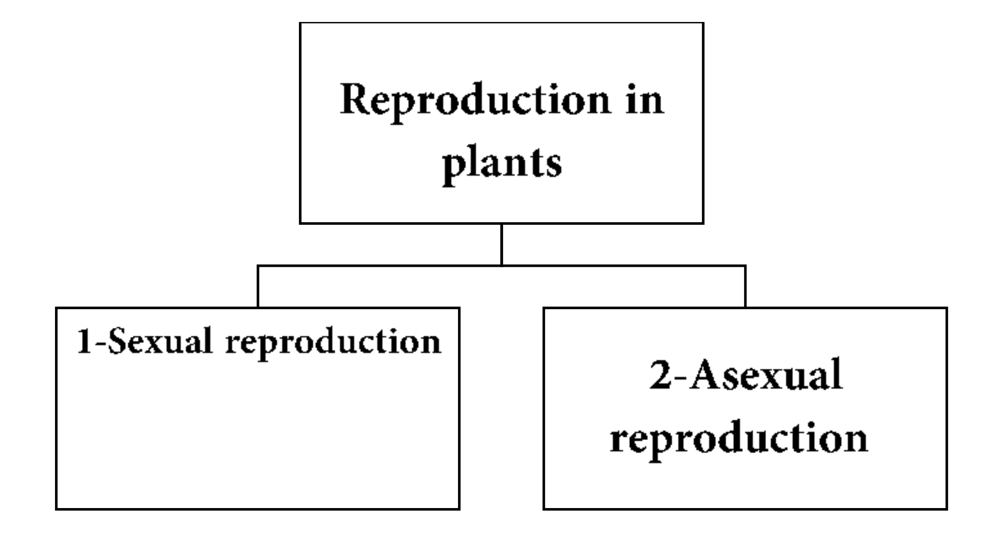
*A typical flower is a flower that contains four whorls.

The typical flower has a thin neck (pedicle) ends in a swollen part (receptacle) which carries the floral leaves in four different floral whorls which are:

Whorl	Calyx	Corolla	Androecium	Gynoecium
Arrangement	1st (outer) whorl	2nd whorl	3rd whorl	4th whorl
Consists of	Sepals	Petals	Stamens	Carpels
description	Small green leaves surrounding the flower from outside	Colourful and scented leaves	Fine threads or filament end in a sac called **anther** which is divided into two parts each part has two chambers	A hollow tube like a flask consists of a swollen part called ovary connected with a tube called **style** which ends in an opening called **stigma**
function	Protection of the inner parts of the flower	*Attraction of insects *Protection of reproductive organs	Production of Pollen grains	Production of ovules.

The sex of the flower

Male flowers	Female flowers	Bisexual (hermaphrodite) flowers
They contain only male reproductive organs (stamens only) **Ex:** Palm, maize, pumpkins	They contain only female reproductive organs (carples only) **Ex:** Palm, maize, pumpkins	They contain both male and female organs (stamens and carples) **Ex:** Tulip, petunia, wallflower





1-Sexual reproduction:

It is the reproduction happens in flowers.

It consists of two processes (**Pollination – Fertilization**).

a) Pollination:

It is the process of transfer pollen grains from a flower to anther to the stigmas.

*The pollen grains found inside the pollen chambers.

Types of pollination

Self (auto) pollination	Mixed (cross) pollination
It is the transfer of pollen grains from the anthers of a flower to the stigmas of the same flower or to another flower in the same plant.	It is the transfer of pollen grains from the anthers of a flower to the stigmas of another flower or to another flower in the other part of the same kind.
Self-pollination	Mixed pollination



Methods of mixed (cross) pollination

Pollination by air (wind)	Pollination by insects	Artificial pollination
-Their anthers are hanged to be easily opened in air. -Their stigmas are feathery like to catch and sticky pollen grains from air. -They produce huge numbers of pollen grains to compensate the grains lost in air. -Their pollen grains are light in weight and dry to be easily carried by air	-Their petals are colored and scented to attract insects to feed on its nectar. -Their pollen grains are sticky or having coarse surface to stick on the insect body.	-It is carried by man. -as in palm trees the gardener spread the grains of male palms to another female palms. -Pollination in palms is difficult to occur by air or by insects.

b)Fertilization:

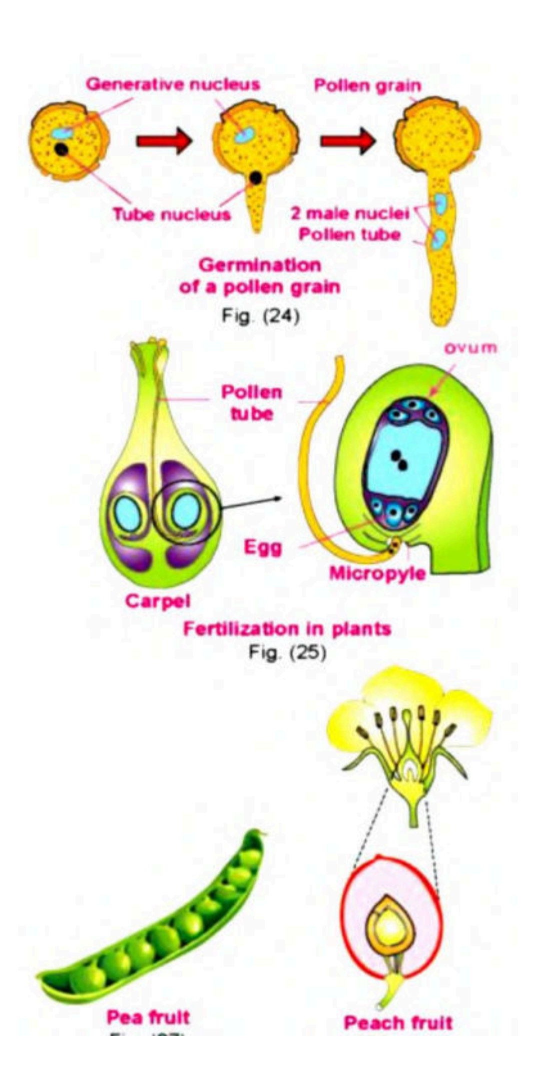
It is the process of fusion of the nucleus of the male cell (pollen grains) with the nucleus of the female cell (ovum) to form the zygote.








Stages of fertilization



1-After pollination, the pollen grain sticks on the stigma which secretes sugar solution.

2-The pollen grain germinates forming a pollen tube contains two male nuclei.

3-The pollen tube extends through the style till reaches the ovule inside the ovary through the micropyle.

4-The end of the pollen tube degenerates and one of the two male nuclei fuses with the ovum forming a fertilized ovum which known as zygote.

5-The zygote undergoes successive division to form the **embryo** inside the ovule.

6-The ovule develops and becomes the fruit.

Fruit differ from each other according to the nature of ovary.

*The ovary that contain one ovule, gives a fruit with as (olives and peaches)

*The ovary that contain many ovules, gives a fruit with many seeds as (beans and peas).

7-After fertilization is completed, the wall of the ovule becomes the seed coat while the ovary becomes the outer coat of the fruit which is called the pericarp.





2-Asexual reproduction in plants:

Some plants have developed a special type of asexual reproduction called Vegetative reproduction.

Vegetative reproduction:

It needs the presence of root, stem, leaves or buds.

Types of vegetative reproduction

1-Natural vegetative reproduction:

It takes place by many ways such as reproduction by

(Rhizomes – Corms – tuber – bulbs – offshoots)

- **Reproduction by tuber:**

The tuber may be

*A root as (sweet potatoes)

*A stem as (potatoes)

In the tuber plants some buds grow forming a root system.

And others grow forming shoot system and after few days new tuber grow.

Old tuber
New tubers

Reproduction by tubers

2-Artificial vegetative reproduction:

It takes place by many ways such as reproduction by

(Cutting – grafting – tissue culture)







▪ Reproduction by cutting:

The cut:

It is the part of root, stem or leaf that taken from a plant for reproduction.

*If you cultivate some cuts

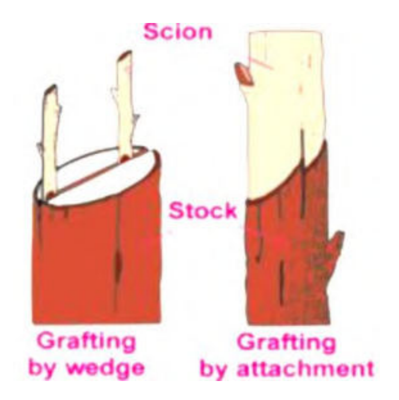
-The bud buried in the soil -------Grow to form the root system

-The bud above the soil ----------Grow to form the shoot system.

Reproduction by grafting

In this type an individual plant which contains more than one bud, known as scion (graf) is selected to be placed on another individual known as the stock.

Methods of grafting:



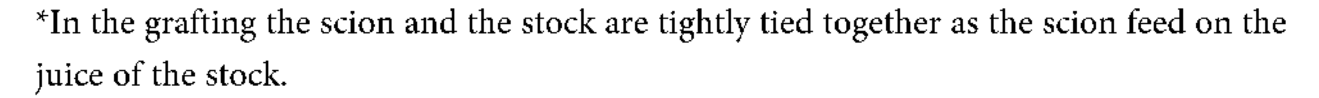
Grafting by attachment:

In which the scion is attached to the stock.

As (mango trees)

Grafting by wedge:

In which the scion in the form of a wedge (pencil shaped) is inserted into a cleft in the stock. As (large trees)



*In the grafting the scion and the stock are tightly tied together as the scion feed on the juice of the stock.

*The fruit produced by grafting belongs to the type of scion.

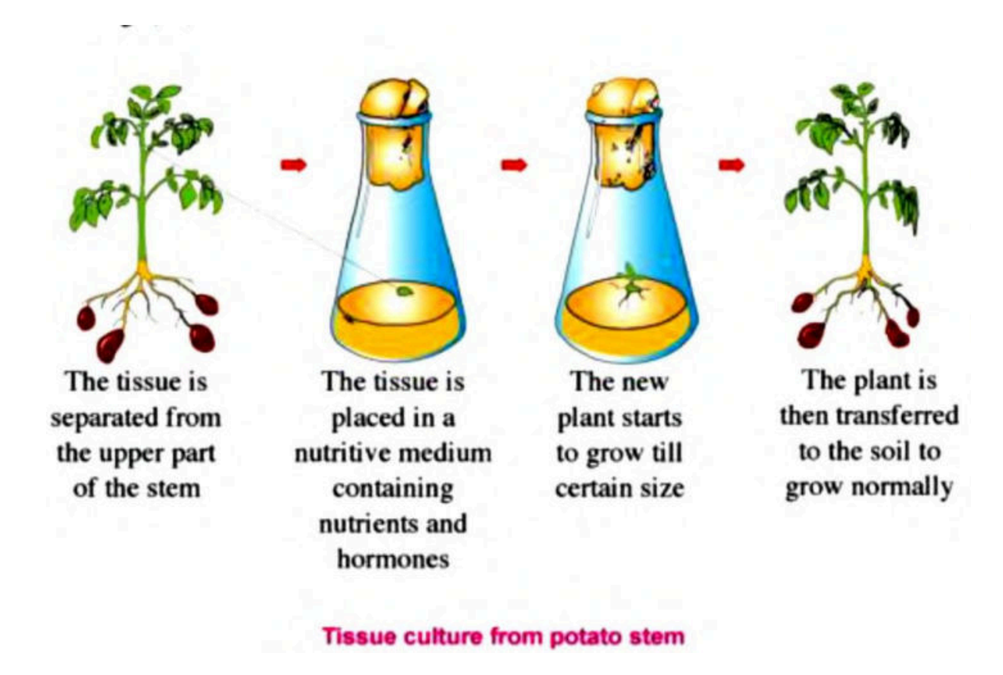
*This kind of reproduction is used only between highly similar plant species

As orange and naring – apple and pears – peaches and apricot



Tissue culture:

It is a process of multiplying a small part of a plant to get many identical parts.



Tissue culture from potato stem







1- Complete the following statements:

1- The flower is protected of ....,.......... and ....

2- The flower is protected by leaflets called .... which form........... part.

3- The calyx is a group of .... leaflets, each of them is called .....

4- The female reproduction organs in the flower are ....

5- The pollen grain germinates on .... forming..................

2- Write the scientific term:

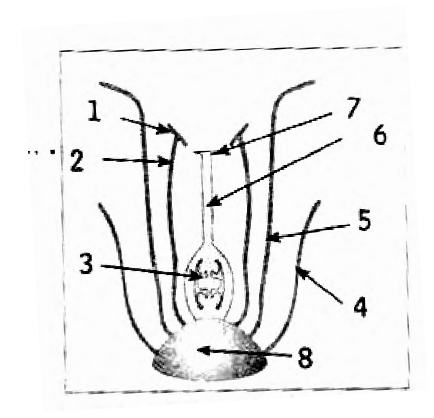
1- An organ that is formed from the flowers ovary when its tissues store food.
[ ]

2- A short stem whose leaves have modified to carry out the reproductive organ.
[ ]

3- Small particles that spread in the air to fertilize the ovules in plant.
[ ]

4- Four pollen sacs containing pollen grains that form a plant organ.
[ ]

3- Look at the opposite figure and answer the question



*This flower is called bisexual because it contains .... and ....

1- Write the names of parts (1,2,3,4,5,6,7,8).

1- .... 2- ....

3- .... 4- ....

5- .... 6- ....





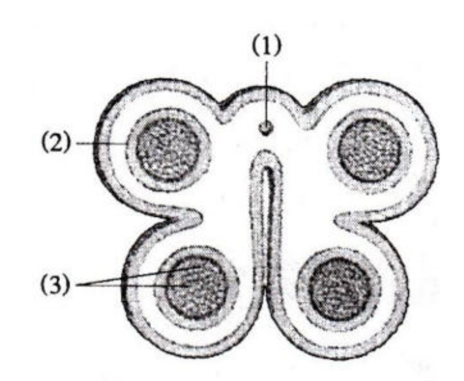
3- Organ No. (3) is ………. and after fertilization . it

forms…………..

4- From the opposite figure , answer the following questions :

1- The figure represents a cross section in an …………

2- Label the figure



1)  ……………………

2)  ……………………

3)  ……………………

6- A) Compare between :

Self-pollination	**mixed pollination**

b) Choose from column (B) what suits it from column (A) :

(A)	(B)
1- Sepal 2- Petal 3- Pollen grain 4- Stamen 5- Ovule	a- is a colored leaflet b- is a female cell c- forms the androecium d- is a male cell e- is a green leaflet f- forms the fruit







7- Give reasons for each of the following:

a- The stigmas of flowers are mostly sticky.

....

....

b- The nucleus of the egg cell contains one half of the hereditary substance.

....

....

c- The flowering plants are called seed-covered plants (angiosperms).

....

....

d- The petals of flower are colored and mostly contain nectary buckets at their bases.

....

....

e- Bean's flower is a typical bisexual flower.

....

....

f-Pollination by air is done in case of the feathery anthers.

....

....

8- Choose the suitable answer:

1- The floral leaves exist on a swollen part upon the flower pedicel called ………..

(ovary – receptacle – calyx – corolla)

1- In large colored flowers, the pollination is done through……………

(air – insects – water – man)





2- Pollination is occurred in palm trees through……...

(insects – wind – man)

3- The male organs of flower are the …… (stamens – pistils – sepals)

4- The female organ of flower is called …………….

(pistil – receptacle – stamen – petal)

5-The potato tuber is a ……………(stem – root – bud – leaf)

6-The innermost whorl of the male flower is the ……………

(gynoecium – androecium – corolla – calyx)

12- put (√) or (×) and correct the wrong :

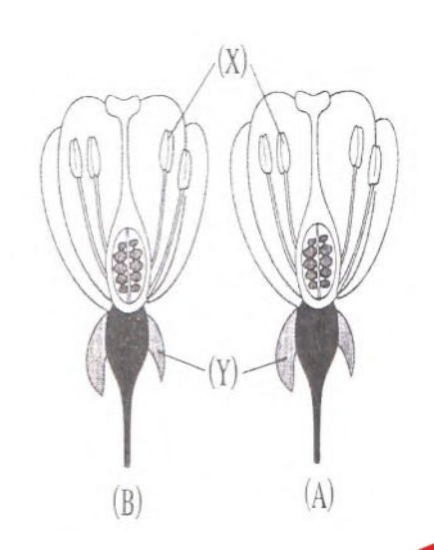
1- The calyx is composed of modified leaflets called stamens. ( )

2- The pistil is composed of stigma, style and ovary. ( )

3- The genetic substance is combined for the same species as a result of the Joining of the sperm and the ovum. ( )

4-The ovary of beans fruit contains one ovule ( )

Examine the following figure ,then answer:



1- what is the function of the part (X)

2-what happens if a pollen grain from the flower (B) is transferred to the stigma of the flower (A)

3- what is the sex of the flower (A)









Unit 3 three

Lesson (2)

Reproduction in human

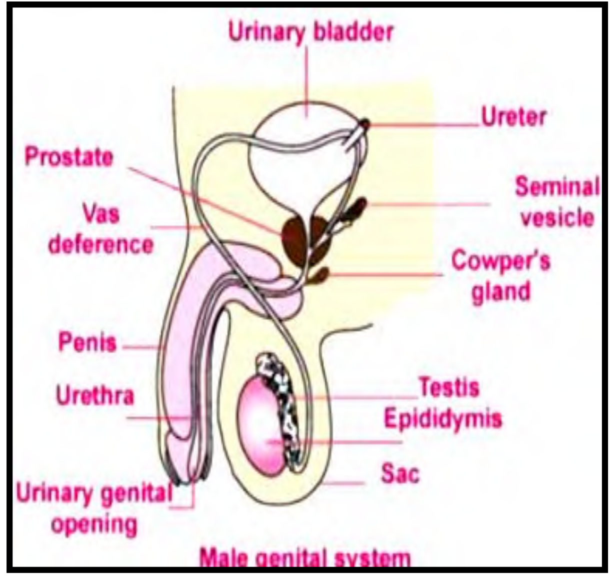
Human using reproductive system or genital system to make reproduction

Reproduction process

Aims to secure the existence and continuity of living organisms.

Structure of genital system in male:

1- The two testes .
2- Vas deferens .
3- Genital associated glands



1) Two testes:

They are two oval (elliptical) shaped glands.

Their function:

1- Production of sperms.

2- Production of male sex hormone. **(Testosterone)** : That responsible for appearance of secondary sexual characters male .

Signs of puberty in human male :

1- Hair growth in certain areas .
2- Growth of moustache and beard .
3- Harshness of voice .
4- Growth and development of the genital organs .
5- Growth of bones and muscles .



[[Note]] : Two testes are enclosed in a sac called **scrotum** (scrotal sac) that regulate the temperature of the testes two degrees below the temperature of the body.

2. Vas deferens:

Tubes that help to transfer sperms from the testes to the urethra .

3. Associated glands :

1) Seminal vesicles . 2) The prostate gland . 3) Cowper's gland .

Function :

Production of **seminal fluid** (Alkaline) that helps in

- Neutralizes the acidity of urethra
- Nourishing the sperms (Contains a lot nutrients) .
- Facilitates the movement of sperms .

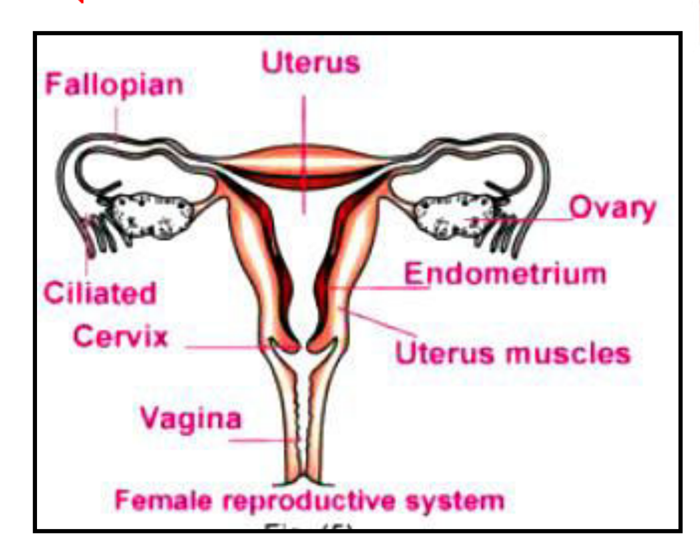
Structure of the genital system of female:

1. Two ovaries .

2. Two fallopian tubes

3. The uterus .

34. The vagina .











1) The ovaries:

Two glands each of the size of peeled almond like structure .

Their functions are :

1) Production of ova, one ovum every 28 days, produced by each ovary mutually (Ovulation process)

2) Production of female sex hormones.

1- Estrogen: responsible for appearance of female sexual characters in female .

2- Progesterone: responsible for the initiation and completeness of the pregnancy .

Sings of puberty in human female :

1. The growth of the armpit and pubic hair .
2. Softness of voice .
3. Growth and development of the breasts .
4. Fat accumulation in certain parts of the body .
5. Start of the menstrual cycle which starts at the age of 11 : 14 years and stops at the age of 45 : 55 years . (**menopause**)

2) Fallopian tubes :

A funnel with finger ended by joining the uterus at its upper corners and lining by cilia .

It's function: move the ova from the ovary to the uterus .

3) The uterus :



Nourishing the embryo in the uterus

Lies in the pelvic cavity between urinary bladder and rectum .

Pear like shaped hollow organ, that can expand during the pregnancy.



"Contains blood capillaries to from placenta to connect food to baby through Umbilical cord" .

4-Vagina:

Muscular tube that expands during the labour to deliver baby

Comparing between male and female gametes

P.O.C	Sperm	ovum
Structure	Nucleus , cytoplasm and cell membrane	head , middle part and tail
Size	Small	Large
Mobility	Mobile	Static
Drawing	Head; Midpiece; Tail; The structure of the sperm	0.1 mm; Cellular membrane; Nucleus; Cytoplasm; Plasma membrane; The structure of the ovum

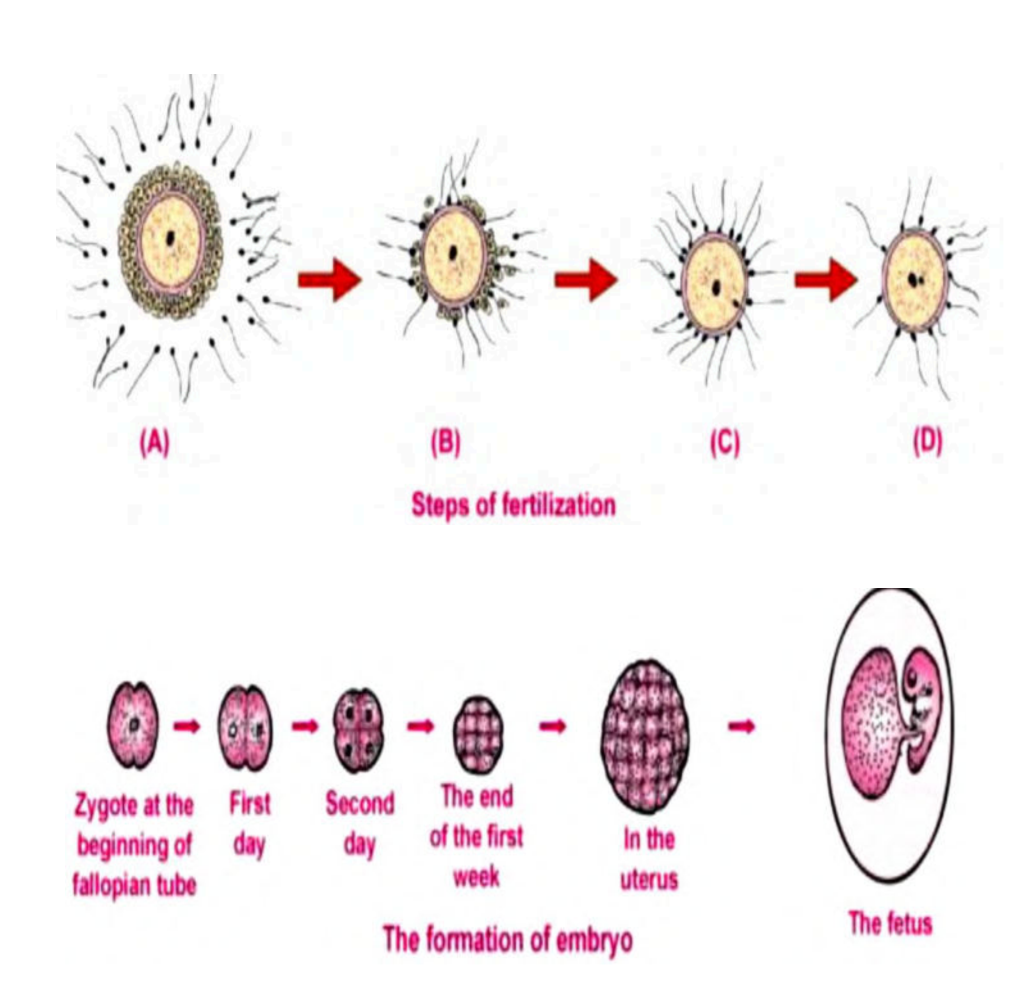
Fertilization:

The fusion between the nucleus of sperm and that of ovum to form zygote.





* **Sperm** (23 chromosomes " N ") + **ovum** (23 chromosomes " N ") = **Zygot** (2 N)



The new born baby will carry the genetic traits from his parents

(23 chromosomes from his father) and (23 chromosomes from his mother)

Diseases of the genital system

First type:

Not arises from the sexual contact like : uterine cancer , prostate cancer puerperal sepsis

Second type:

Arise from the sexual contact STDs , like gonorrhea , syphilis and AIDS .





P.O.C	Puerperal sepsis	Syphilis
The microbe that cause the disease	Spherical bacteria	spiral bacteria
Methods of infection	1-by droplets from a person infected with bacteria or suffering from throat infection or tonsillitis to a vagina or recently labored mother 2- an infected wound during labor	1-Sexual contact with an infected person 2-From a pregnant woman to her fetus
Incubation period	1:4 days	2:3 weeks
Symptoms	1-increase in the body temperature , 2-chilling 3- pallor 4-severe acute pain in the lower abdomen 5- Bad smelling secretion from uterus.	1) Formation of painless hard ulcer on the head of the penis in males and in the vagina and upper part of the cervix in female . 2) Dark brass colored rash appears on the back and hand of the patient **Complications** 1-Tumors in the liver, bones and parts of genital system 2-The brain may be damaged 3-death
Means of protection prophylaxis	1-sterilizing the surgical tools 2-wearing masks during labour 3-the mother should kept warm and avoid exposure to air currents	1-preventing the sexual contact with an infected person 2-the abortion of the infected pregnant woman







Incubation period

The period between the beginning of infection and the appearance of symptoms of the disease

The effect of smoking and addiction on the genital system:

1-decreases the formation of male and female hormones

2-death of the embryo and recent born babies

3-Increasing the deformation rate in the embryo





Homework

1- Complete the following statements:

1- The genital system in human male consists of ……………. , ………..… ,………… and …………….

2- The function of the testis is ……….…….… and ………….………..

2- The two testes are enclosed inside a sac known as …………….

3- The genital system of human female consists of ………… , …..…….. , ……..… and ……………..…..

4- The two ovaries produce ………. every 28 days, also they secret the….… hormones, namely ……………..….. and ……….……..

5- The hormone that responsible for the initiation and continuity of pregnancy is …………….

6- ……………... causing ………………… disease are transferred by sexual contact with a person infected

7- ……….. causing ……….. disease are transferred by droplets from a person infected to a mother who's just given birth to a child

8- ……………… and …………… are examples of genital diseases which don't arise from sexual contact.

2- Choose the correct answer:

1-Does the temperature inside the body suite the sperms to grow inside testis?:

a) Yes, because its growth requires temp. 37°c
b) Yes, because its growth requires temp. Higher than 37°c
c) No, because its growth requires temp. Less than 37°c by two
d) No, because its growth requires temp. of a hot medium

2- The fallopian tube leads to……………………..

a) Ovary b) Uterus c) Cervix d) Vagina







3- The male genital glands secret…………………...

a) Sperms b) Alkaline fluid

c) Seminal fluid d) Testosterone hormone

3- Correct the underlined words:

1- The ovum is fertilized at **the end** of fallopian tubes.

2- The fetus can be delivered by the **13th week.**

3- **The uterine cancer** disease arises from sexual contact.

4- Syphilis is caused by a special type of **spherical** bacteria

5- The **ovum** is a mobile cell, of a relatively large size.

4- Write the scientific term for each of the following statements:

1. The process of producing ova from the ovaries mutually every 28 days
2. A group of fine highly looped tubes/are attached to testis.
3. Two glands that produce the female cells in human female Organ in which the fetus is formed and protected until birth.
4. It is the process of fusion of the nucleus of the male cell (pollen grains) with the nucleus of the female cell (ovum) to form the zygote
5. The period between the fertilization and delivery
6. The incubation period of syphilis disease
7. A genital disease that can be treated in all symptoms stages

5- Give reasons for:

1- The scrotum is hanging down outside the body.

………………………………………………………………………………

2- The associated glands secrete alkaline fluid .

………………………………………………………………………………



3- The ovum is relatively large size .

....

4- Surgical tools must be good sterilized and masks are used during delivery .

....

6- What happens in the following cases…?

1- The tail of the sperm disappears.

....

2- If the fallopian tubes became obstructed in surgically tied .

....

7- Compare between:

1- The ovum and the sperm (according to mobility)

8- The opposite figure shows the genital system of the human male

1) Which of the following shows the path of sperms through it?

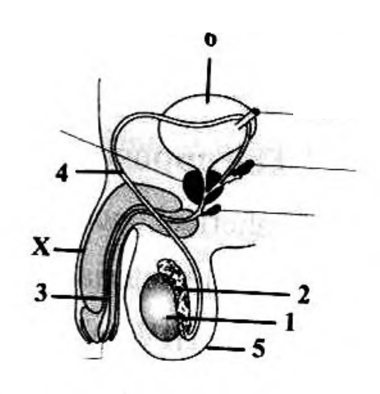


a) 2 ⟶ 4 ⟶ 3 ⟶ 1.

b) 1 ⟶ 2 ⟶ 4 ⟶ 3.

c) 3 ⟶ 1 ⟶ 2 ⟶ 4.

d) 4 ⟶ 3 ⟶ 1 ⟶ 2.

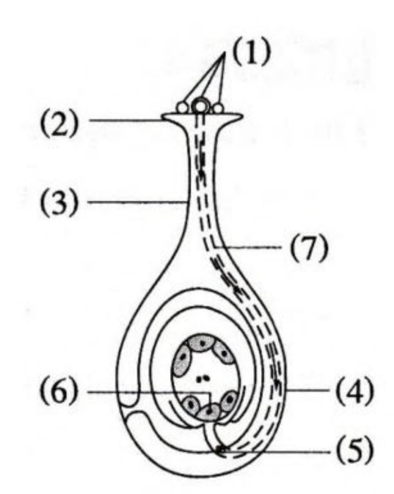


2) What does (X) represent?:

3) Write the labels.







9- Examine the opposite figure , then answer the following :

1- Write the names of the parts numbered from (1) to (7) .

1) ………………..   2) ………………..

3) ………………..   4) ………………..

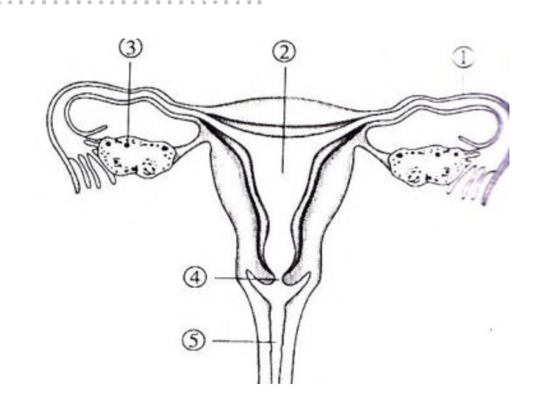
5) ………………..   6) ………………..

7) ………………..

10- What is meant by fertilization?



……………………………………………………………………………………………………



Examine the following figure ,then answer:

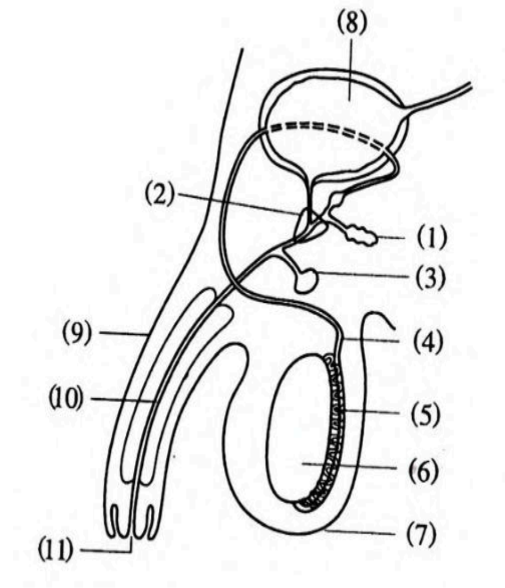
1- what is the name of this system?

2-replace the numbers

Examine the following figure ,then answer:

1- what is the name of this system?

2-replace the numbers



3- what is the function of (5)



Test (1)

Question (1) :-

A) Put (√) or (×) and correct the wrong ones :

2. The calyx is the green outer whorl of the floral leaves . [ ]

3. The quantum of energy of violet light is higher than that of the yellow light . [ ]

4. The velocity of a given wave is constant as it travels through different media . [ ]

5. Jacuzzi is used to break down the kidney and ureter's stones . [ ]

B) Give reason for :

1. Bean's flower is a bisexual flower .

....

2. Sound waves can't transfer through the space .

....

Question (2) :-

A) Complete the following statements :

1- When the amplitude of a sound wave vibration is doubled , the intensity of the sound .... four times .

2- .... is considered as an electromagnetic wave .

B) What is meant by :

1- Translucent medium .

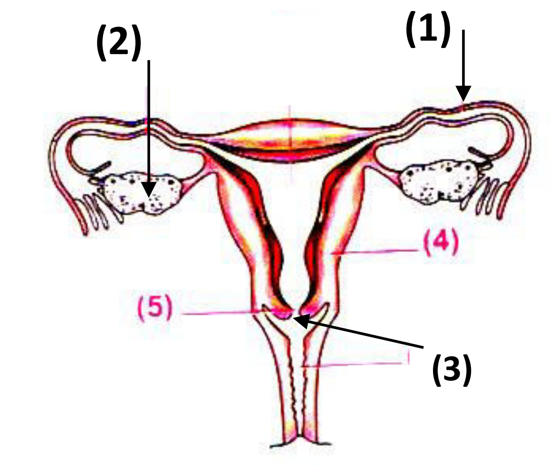




1- The amplitude of an oscillating body = 10 cm .

....

C) The opposite figure represents the female genital system , complete the following labels :



1- ....

2- ....

3- ....

Question (3):-

A) Choose the correct answer :

1- In large coloured flowers , the pollination is done through ……..…………

a- air b- insects c- water d- man

2- A swing completes 40 cycles in 20 seconds , the periodic time will be ………... .

a- $\frac{1}{2}$ sec b- 800 sec c- 2 sec d- 1 sec

3- The male genital system consists of vas deferens , penis and ……………..…….

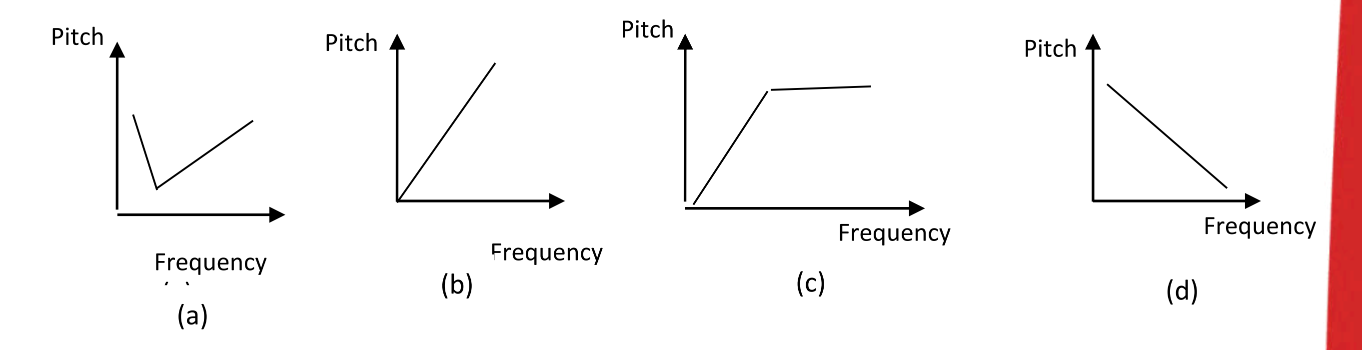
a- urethra b- cervix c- vagina d- endometrium

4- If the angle between the incident sound ray and the reflected sound ray is 110° , the angle of incidence = ……….°

a- 70° b- 110° c- 55° d- 140°



5- Which of the following graphs represents the relation between the sound pitch and its frequency .



Question (4):-

A) Write the scientific term :

1- The distance between two consecutive crests . [..............................]

2- The transfer of pollen grains from the anthers of a flower to the stigma . [..............................]

3- The quantity of light falling perpendicular on a unit area of a surface in one second. [..............................]

4- It is the movement of an oscillating body when it passes through a single point two consecutive times in the same direction . [..............................]

B) Find the odd word out :

1) - yellow - white - blue - red

2) - sonic wave - ultrasonic wave - water wave - Infrasonic wave

C) What happens if :-

1- The testes stop their prouction of testesterone hormone .









Test (2)

1st Question : A) Complete the following :

1- ………………. color has the highest frequency and energy while ……………

color has the lowest deviation angle .

2- The transverse wave consists of ………………. and …………

B) What is the importance of :

1- The two ovaries in the female reproductive system .

……………………………………………………………………………………………

C) Find the odd word out :

1- Stigma / style / filament / ovary .

2- Sound pitch / sound waves / sound intensity / sound quality .

2nd Question: A) Write the scientific term:-

1- The angle between the emergent light ray and the normal at the point of emergence on the interface . [……………………………..]

2- It is the highest density and pressure area in the longitudinal wave . [……………………………..]

3- A male hormone that responsible for the appearance of secondary sex characters . [……………………………..]

B) Give reason for :

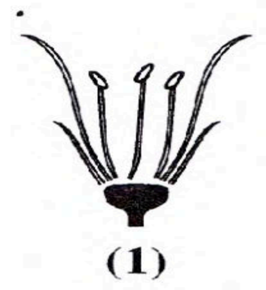
1- Ultrasonic waves are used in food sterilization .

……………………………………………………………………………………………





C) Determine the sex of each flower :


(1)


(2)


(3)

3rd Question A) Correct the underlined words :-

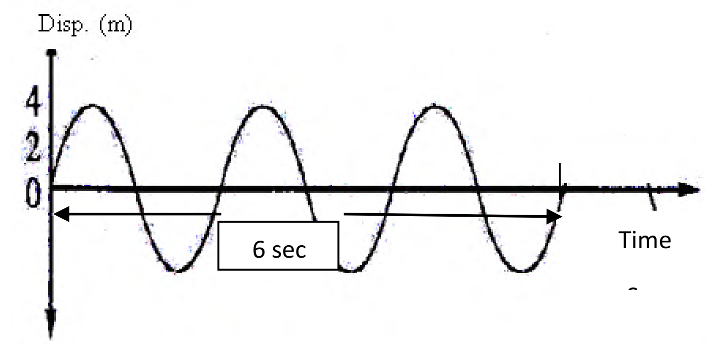
1- The plants of feathery and sticky stigma can be pollinated by insects .
2- Syphilis is caused by a special type of spherical bacteria .
3- The energy of the photon = Planck's constant × wave length
4- Sound is considered as an electromagnetic wave .
5- The measuring unit of sound type is watt/m^2

B) What happens if :

1- The two testes are present inside the body .

2- A light ray falls perpendicular on a reflecting surface .

C) From the opposite figure , find :



1- Frequency .

2- Wave length .

3- Amplitude

4th Question A) Choose the correct answer :-

1- When a light ray passes from air to water through an angle of incidence = 50° ,

The angle of refraction will be ....

a) 30° b) 50° c) 70° d) 100°









2- The sound of frequency 500 HZ is ……….. than the sound of frequency 300 HZ .

a) weaker b) harsher c) stronger d) sharper

3- The female genital system consists of ovary , fallopian tube and ………..

a) testes b) vas deferens c) uterus d) urthera

4- A pendulum makes 120 cycles in 30 seconds , its periodic time equals …………..

a) $\frac{1}{4}$ sec b) 4 sec c) 1 sec d) 3600 sec.

B) What is meant by :

1- Opaque medium .

……………………………………………………………………………………………

2- Pollination .

……………………………………………………………………………………………

C) Mention the relation (If it is equals , directly or inversely) between each of the following :

1- Light intensity and the distance between the light source and a surface .

2- Wave velocity and wave length .

4- Angle of incidence and angle of reflection .



Test (3)

Question (1) : A) Write the scientific term :

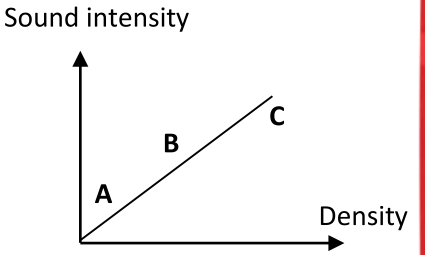
1- The fusion between the nucleus of the sperm and that of the ovum to form zygote .

2- The bouncing of sound to the same medium due to meeting a reflecting surface .

3- It is the maximum displacement done by an oscillating body away from its point of rest

4- The spectrum color of the shortest wave length and maximum deviation .

B) In the opposite graph :



1- The medium which gives the strongest sound is ....

2- The medium which gives the weakest sound is ....

C) Write the importance for each of the following :

1- Corolla

....

2- Fallopian tube

....

Question (2) : A) Choose the correct answer :

1- Light intensity is the amount of light falling ....to the unit area of the surface in one second .

a) perpendicular b) inclined c) parallel d) a and b

2- The human male reproductive system contains all the following except ....

a) vas deferens b) two testes c) uterus d) the penis

3- A body of frequency 50 Hertz makes a complete oscillation in ....second .

a) 5 b) 50 c) 0.02 d) 0.2









B) Give reason for :

1- The absolute refractive index of any transparent medium is always greater than one

……
.

2- Stigma of some plants is feathery – like and sticky .

……

C) Two sound waves , the first of wave length = 6.8 meter and the second of wave length = 20 meters , If the velocity of sound through air is 340 m / sec . Which of the two waves is audible and which of them is non-audible ? Why ?

……
……
……

Question (3) : A) Complete the following statements :

1- ……………..is a natural phenomenon that takes place on the desert road at noon .

2- The velocity of the oscillating body …………………..when it passes through its position of rest .

3- After fertilization process in plants , the ovary grows forming ………………...

4- ………………tones are the tones that associate the fundamental tone which are less in intensity and higher in pitch .

5- The human skin is considered as ……………….medium while water is considered as …………………….medium .

B) Cross the odd word out :

1- Prostate gland - seminal vesicle - salivary gland - Cowper's gland

2- Cytoplasm - Mid piece - Nucleus - Cellular membrane

C) What is meant by :

1- The wave length of a water wave is 15 cm .

……



2- The first law of light reflection .

....

Question (4) : A) Correct the underlined words :

1- Puerperal sepsis is a genital disease caused by **spiral** bacteria .

2- The **electromagnetic** waves are classified into transverse and longitudinal .

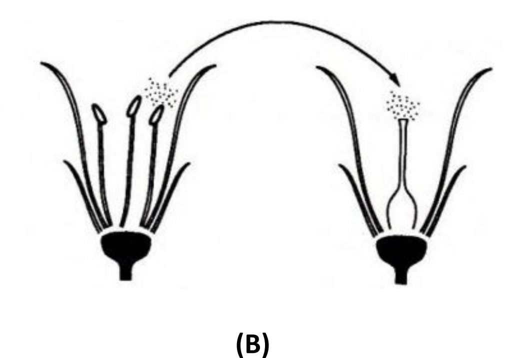
3- Multiplying the frequency of an oscillating body by its periodic time equals **wave length .**

4- **Estrogen** hormone is responsible for the initiation and completeness of the pregnancy .

B) What is the type of pollination in each figure :



(A)



(B)







Test (4)

1st Question : A)Complete the following statement :

1- The longitudinal wave consists of ……………….. and ………………

2- Pollination by ……………. takes place in flowers whose anthers are hanged and their stigmas are sticky and feathery.

3- As the frequency of the source decreases, the sound ………….. decreases while as the density of the medium through which the sound travels, increases the sound…............. increases.

4- ……………. motion and ………..motion are examples of periodic motion.

5- The quantum of energy of orange light is ………….. than the quantum of energy of yellow light.

B) Give reason for:

1- The seminal fluid is alkaline .

……………………………………………………………………………………………….

.

2nd Question: A) Write the scientific term :

1- Changing the path of light when it travels from a transparent medium to another transparent medium of different optical density.

2- The fusion of the male nucleus (pollen grain) with the female nucleus (ovum).

3- A movement made by the oscillating body when it passes a single point in its path of motion two consecutive times in the same direction.

4- A medium that permits a part of the light to pass through it and absorbs the remaining part .

5- The tones accompanying the fundamental tone but they are higher in pith and less in intensity.





6- The distance that covered by the light in one second.

B) Compare between :

1- The ovum and the sperm according to.

(Size – Structure)

3rd Question: A) Choose the correct answer:

1- …………… is considered as the male reproductive organ in the flower.

a) Carpel b) Stamen c) Sepal d) Petal

2- The refractive index of the glass = ……………..

a) 0.5 b) 1 c) 1.5 d) no correct answer

3- When a light ray is incident perpendicularly on a reflecting surface, it will ……

a) be reflected with angle 90^0 b) be reflected with angle 45^0

c) be reflected with angle zero d) not be reflected

4- If the distance between the light source and a surface decreases to its half, the light intensity……..........

a) decreases to its half b) decreases to its one fourth

c) increases to its double d) increases four times

5- The doctors use waves which have frequency ………….., to break down the kidney and ureters stones.

a) 20 HZ b) less than 20 HZ c) more than 20 KHZ d) b or

B) Mention the function of each of the following:

1- Corolla

4th Question: A) Write the scientific term:

1- **Blue** color has the highest deviation and it is the closest one to the prism b

2- Puerperal sepsis diseases is caused by **Spiral** bacteria.

3- If the periodic time of an oscillating body is 0.1 seconds, the time taken to make 10 complete oscillations is **5** sec.







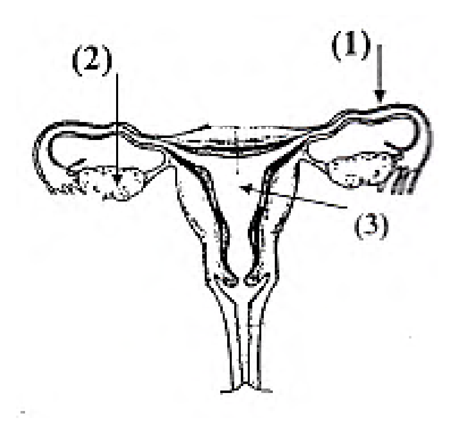
4- **m/sec** is the scale unit of noise intensity.

5- **Emergence** angle is the angle of incidence in the denser medium that causes a refraction angle equals to 90^0 in the less dense medium.

B) What is meant by:

2- Sound intensity

C) In the opposite figure, write the labels



Test (5)

Question [1]: A) Write the scientific term :

1- The motion that done by an oscillating body when it passes by a fixed point in its pass of motion two successive times .

2- A property by which the human ear can distinguish between strong or weak sounds .

3- The motion made by a body around its point of rest and repeated through equal intervals of time .

4- It is an external stimulus that affects the ear causing the sense of hearing.

B) What is meant by :

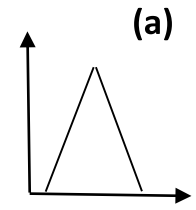
1) Electromagnetic wave .

C) Which of the following graphs represents the relationship between:

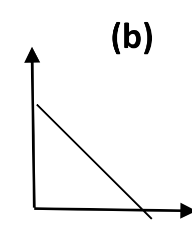
1- Sound intensity and the distance between the sound source and the ear.

2- Angle of incidence and angle of reflection .

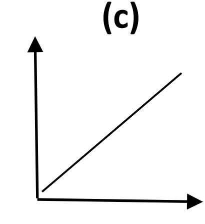
(a)



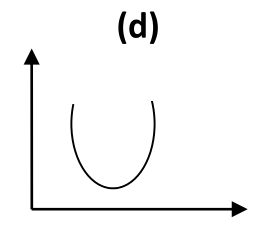
(b)



(c)



(d)







Question [2] A) Choose the correct answer :

1- The sound of frequency 300 HZ is .... than the sound of frequency 220 HZ .

a) harsher b) sharper c) stronger d) weaker

2- When the amplitude of vibration of the sound source decreases to it half , the sound intensity.....

a) decreases to the half b) decreases four times

c) increases two times . d) increases four times .

3- If the frequency of the fundamental tone of a musical instrument is 120 HZ ,the frequency of the accompanied harmonic tones will be .... HZ.

a) 100 b) 120 c) 160 d) no correct answer

4- If the sound velocity at the air is 340 m/sec. The sound velocity at the water will be ......

a) 170 m/sec b) 340 m/sec c) zero d) 1500 m/sec

Question [3] A) Put (√) or (×) and correct the wrong once :

1- The measuring unit of sound intensity is decibel .

2- The kinetic energy of an oscillating body reaches its maximum value when it passes through its original position .

3- Infrasonic waves are the sound waves of frequencies less than 20 HZ.

4- lightning is considered as a transverse wave .

B) What happens if :

1- The distance between the centers of two consecutive compressions increases .





Question [4] A) Complete the following statements :

1- If the maximum displacement that done by an oscillating body away from its original position is 0.4 cm which is made in 0.5 sec., Its periodic time =……………………….

2- When turning Savart's wheel with a speed of 100 rotations /minute using a gear of 120 teeth , the frequency of the produced sound = ………………

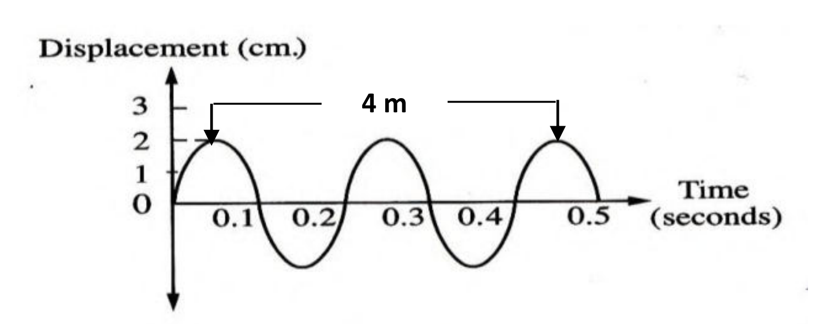
3- If the angle between the incident sound ray and the reflecting surface is 90° , the angle of reflection = ...

B) From the opposite figure , calculate:

1- Amplitude .

2- Frequency .

3- Wave velocity .



Good Luck...





